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IN the year 1867 Canada gave birth to two babies—Confederation and the Canadian Medical Association. Both started out with an objective—one to be the greatest country in the British Commonwealth, and the other the greatest body of organized medicine. Neither has reached the goal of its ambition, but both are confident of success. From its inception the Canadian Medical Association has been an advocate for every possible advance, not only in medical education but also in public health work. Membership in 1867 was 164; in 1932 it was 4,000.

The progress that medicine has made in the past hundred years has been stupendous. Few outside the medical profession realize the vastly important part that medicine has played in shaping civilization. Now and then a writer in the field of general history seems to recognize very vaguely that modern civilization owes, perhaps, a debt to medical science; and some few, and they are certainly the exception, pay a passing tribute to it.

The Bulletin of the New Haven Department of Health gives a slight reminder of what has been accomplished between the years 1881 and 1931—the death rate per 100,000.

	1881	1931
Typhoid fever	43.2	0.0
Diphtheria	90.0	0.6
Infantile diarrhoea	109.0	1.9
Tuberculosis	393.1	57.17
Cancer	64.9	124.6

The above is just the medical contribution to civilization. Surgery has in the past fifty years been revolutionized many times, and has contributed even more to civilization. Unfortun-

ately, the advances are known only to the medical profession. This might be corrected if the public were educated in medical matters by letting them know more of what is going on in a medical and surgical way and relaxing our severe adherence to medical ethics.

The great redeeming feature in the profession of medicine is that one never knows it all. We must keep constantly studying, to keep up with the rapid advances in the two great branches, medicine and surgery. These two branches have for the past fifty years been striving for supremacy, and it would appear that surgery has been in the lead.

In the year 1886 Dean Palmer Howard, of McGill, in an address to the students, said that medicine would always take precedence over surgery. On looking back, the surgeon has been, in the eyes of the laity, as well as in the eyes of some of the profession, the leading factor. During the last few years medicine has been coming rapidly to the front in new methods of treatment, and because of such methods is making inroads into the surgical field. Take for example, gastric and duodenal ulcer. Not many years ago gastric and duodenal ulcers were considered entirely a surgical condition. More recently, when results were compared, the decision has been in favour of medical treatment as giving more lasting results. At the present day both physicians and surgeons are agreed that surgery is the last resort for this condition.

In the year 1862 Henry Heath, then president of the British Medical Association, in his presidential address said that surgery had about reached its limits. A few months ago Lord Moynihan stated in one of his addresses that surgery had achieved its end and would in the future carry on by improved methods in

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diagnosis and refinements in technique. Time will tell whether Lord Moynihan is more correct in his prognostications than Henry Heath. Surgery has for the past fifty years concerned itself with the application of mechanical measures for the repair of mechanical defects. We are now entering upon a new era. The future of surgery will seek also to deal with the disorders of function in organs and will base itself upon a knowledge of physiology, the science of normal function. We are entering the era of physiological repair by the craft of surgery. The surgeon of the future must travel with the physiologist. It is quite in line that the physiologist, associated with the surgeon, may some day through the discovery of the true function of the endocrines and their interrelation develop a cure for cancer. In the meantime medicine is forging ahead, and a great many conditions that are to-day treated surgically will be treated medically, because the medical man is associated with the physiologist.

The report of the New Haven Department of Health, where the death rate of cancer in 1881 was 64.9, and in 1931, 124.6, per 100,000, indicates the cloud in the sky that has not as yet shown a silver lining so far as our knowledge as to cause is concerned. Cancer still holds the medical profession at bay. We are no wiser as to etiology than we ever were. When I was a student at McGill, Professor Adami defined cancer as "Cells running wild;" I have always felt that to date it is about the best definition yet given,—“Cells running wild.” If the above idea is correct, then we should concentrate on the individual cell and learn why such rapid proliferation—has it an intercellular or an extracellular cause?

A cell, as you know, consists of a cell wall and cell contents, and the cell contents are protoplasm. We do not know the chemistry or the physiology of protoplasm. If we did, then we would know what life is; I doubt whether the Lord ever intended that we should know, because if we did I have not the slightest doubt that some of our enterprising friends to the south of us would be making babies on the instalment plan!

What is it that starts the cancer cell on its malignant career? What extraordinary impulse is implanted in a group of cells to make them run amuck throughout the body? We do not know. Under the microscope we can see the

birth of a cancer; we can see it grow; we can see it spread; we can see it invade and destroy the healthy tissues; we can tell cancer cells from tissue cells; we can classify and grade the different types of cancer and tumour-growth. Whole chapters in the life-history of cancer are open to our view, but the chapters that we are most anxious to read are closed. These are the chapters on the primary cause and on the essential nature of cancer. Perhaps the analogy that is easiest to follow is to look upon cancer as a local rebellion of a group of discontented cells within that commonwealth of working cells which form the human body. The rebellious cells throw off all restraint, and if the local riot be not promptly checked by heroic measures it may develop into a generalized invasion which destroys the whole commonwealth.

But what is it that generates this discontent and excites this rebellion? It may be that some evil foreign influence has entered into the lives of those cells, changing their character and transforming them from law-abiding workers into lawless destroyers. This corresponds with the hypothesis that cancer is caused by a special and external cancer parasite, of which, however, there is no certain proof. The fact that cancer is non-infectious has always been a difficulty in the way of that hypothesis. The truth is that the only known parasite of cancer is the cancer cell itself. Indeed every new growth, whether it be cancerous or non-cancerous, is a new birth of cells, each of which is parasitic upon the parent organism. The only difference between the cancer and the non-cancer is that the former is more invasive and more destructive than the latter. That parasitic character distinguishes tumour growth from all other new formations of tissue and gives it a unique biological position. The extraordinary fact is that this new growth or parasite is the immediate offspring of the cells of the human body. It is not introduced from without; it is generated from within. In the most literal sense, therefore, the cancer parasite is the cancer cell; and, so far as we know, there is no other parasite of cancer.

If you take a histological slide of the skin, for example, you will find a regular alignment of cells—why this regularity? Is it the result of an intercellular inhibitory influence or an extracellular one? The same question might be asked of any histological slide taken from any part of the body. If this inhibitory influence did not

exist then you would be justified in finding the cells in groups or irregular outgrowths, in other words, running wild.

Cancer cells are carried by the lymphatic and blood streams to distant organs in the body, and there produce a growth similar to the original. This would tend to show that the individual cell had the power of reproduction; with this power of reproduction you would naturally suppose that cancer-cell growth would be due to some change in the chemistry or physiology of the individual cell.

Persistent and recurrent attempts to discover a micro-organism as the causative agent of cancer have been failures. There is, however, steadily increasing evidence that cancer is actually an active and assertive area of the individual in which it occurs, and is not an invasion from without by a foreign body. Cancer, therefore, becomes less acutely pathological and more biological in nature. As such, it at once becomes affiliated in research with problems of normal metabolism, endocrinology, and growth. You are all well acquainted with the various and sundry theories and authorities claiming to have isolated an organism which is the causative factor in cancer. You have seen the various organisms advocated by their discoverers as etiological factors presented to the medical profession for consideration and then these views have died a natural death. Why? Because these organisms are not the causative factors in cancer. By general agreement of competent investigators it is throughout accepted as a fact that spontaneous cancer cells descend from normal cells of the tissue in which the cancer arises. As nearly as anything can be certain in medicine, there is no cancer contagion, *i.e.*, specific infection. Observations seem to prove that cancer is an individual experience.

The current experimental production of primary cancer by various non-specific means makes the search for a specific cancer agent appear no longer advisable. Cancer cells form no tissue, but ordinarily lie disconnectedly and loosely side by side in the stroma, without physical connection with the stroma. Cancer cells perform no function in the system, nevertheless live upon it. Cancer cells acquire so large a measure of independence from any particular tissue that they can be disseminated throughout the system like bacteria, that they form metastases wherever they find lodgment, and that

such metastases are structurally like the primary growth. The great argument against a specific agent is the benign tumour. A clearly defined borderline between benign and malignant tumours exists neither in theory nor in practice. Inasmuch as no sharp line can be shown between benign and malignant tumour growths, a theory is wrong in principle which covers only carcinoma. No theory as to the causation of tumour growth can be satisfactory which does not apply equally to benign and malignant tumours. As previously stated, cancer formation seems to be a question bound up with normal metabolism or physiology, endocrinology and growth. Under date of May 20, 1932, the Rockefeller Institute suggested the possible discovery in embryonic skin of a substance that can inhibit growth. The explanation is that this new agent may be a part of the mechanism long sought by science which stops growth in any part of the body at just the right time. For example, any member of the body ceases growth under normal conditions at a time when it has attained its relative power in the maintenance of the functions of the body as a whole. In addition to the existence of this substance in embryonic skin it is believed to exist also in the placenta.

That endocrine glands are involved in the cancer problem has been suspected and asserted by many. This involves two assumptions—first, that cancer has a constitutional diathesis behind it; secondly, that cancer is due to a pathological biochemistry of the diseased organ or tissue. Precancerous lesions, so-called, are the expression of the constitutional pathological chemistry of the tissues.

The evidence is strong that cancer is a disturbance of growth. Growth is a matter of balance and interlinked reactions, involving, first, the building stones of growth, supplied by food, and, secondly, the regulators of growth—the endocrine glands and their hormones. In any disturbance of growth one should then look for a disturbance in the balance and ratio of the food substances and endocrine products being supplied to a given organ. All organs are not equivalent as regards the needs of different food substances and hormones. A specific, metabolic and endocrine mechanism exists for each organ, disturbance of which causes disturbance of growth. A great many clinical experiences favour the hypothesis that each tissue cancer is a specific local disturbance of metabolism, due to

an imbalance between the growth-stimulating substances derived from the diet and the endocrine glands and the growth-inhibiting substances, derived also from the diet and endocrine glands. In certain cases there probably exists an unbalanced state in several of the ductless glands, which permits the development of new growth. We at present know that disorders of the pituitary gland produce conditions called gigantism and acromegaly, and that disorders of the thyroid produce cretinism and myxœdema. There may also be a disturbance of the physiological interrelationship of the glandular or of the other systems, as the nervous or lymphatic.

Sampson Handley now claims to have detected a pre-cancerous condition which is constantly present in cancer production, namely, lymph-stasis. He considers that lymph stasis is the cause of cancer, or there may be three possible conceptions—lymph stasis may be the essential cause; it may be a contributory cause; or it may be a constantly associated phenomenon unconnected with the causation of the disease.

Waslaw Karnicke has made an extensive study of the influence of the endocrine glands upon the genesis and behaviour of experimental carcinoma. He performed six series of experiments on rabbits, with five animals to the series, for the purpose of determining the influence of the endocrine glands upon (1) the formation of experimental carcinoma, and (2) the behaviour

of such carcinoma after formation. On the basis of his studies he found that:— (1) the endocrine glands have an active influence upon the formation and the spreading of neoplasms induced in rabbits by the application of tar; (2) that removal of the thymus has an active effect upon the occurrence of experimental neoplasms and accelerates their growth fourfold; (3) that the extirpation of the thyroid and parathyroid glands likewise accelerates the formation of neoplasms.

He also found that extirpation of a suprarenal capsule very strikingly *checks* the occurrence and growth of the neoplasms. Time will not permit my mentioning all of his results, but the conclusions arrived at on the basis of this series of experiments are in accordance, for the most part, with his hypothesis and the results obtained by a large number of investigators in the field of metabolism and its relation to neoplasms, particularly those of carcinomatous character. Until the mutual influence of the endocrine glands is made clear it will be difficult to determine the reason for the checking and acceleration of growth of the neoplasms. It would appear, therefore, from a study of the efforts of the different workers on this very important disease that cancer could be caused by some disturbance of the physiological interrelationship of the endocrine glands, and the man to make the discovery is the physiologist.

CARBON DIOXIDE WITH DISCRETION.—There is now a wide vogue for the use of carbon dioxide gas in association with inhalation anæsthetics. The gas is employed to facilitate induction of anæsthesia, to stimulate failing respiration, and to hasten the elimination of inhaled anæsthetic vapours. It is timely therefore to draw attention to the great powers which carbon dioxide has for evil as well as for good. Anæsthetists do not all appreciate the varying reaction to the gas of different normal individuals under identical conditions; this difference of reaction is even more marked among the sick. A dose of CO₂ safe enough at one time may be dangerous to the same person under altered conditions, or to other persons under the same conditions. R. M. Waters quotes the case of an infant showing marked respiratory obstruction under ether. Its colour was kept pink by high tension of oxygen maintained in the atmosphere which passed the obstruction with each respiratory effort.

A carbon dioxide mixture was foolishly administered on the release of the obstruction at the end of operation, without regard to the probable association of high blood carbon dioxide with the respiratory obstruction. Both respiratory and circulatory depression followed immediately and the infant died within a short time. Waters attributes the fatal issue in no small measure to the addition of carbon dioxide at the end of this anæsthesia. The highest concentration of CO₂ which the average person can inhale without producing subjective symptoms appears to be 10.4 per cent. This produces the maximum stimulation of respiration and can be inhaled for two and a quarter minutes. Obviously it is not to be employed in ordinary practice; 7 per cent seems to be the highest dosage to be used in connection with anæsthetics, a concentration of 10 per cent inhaled for 10 minutes or so producing unconsciousness. Attention to these findings should prevent a valuable restorative from falling into disrepute.—*The Lancet*, 1933, 1: 1356.

THE EARLY DIAGNOSIS OF CANCER OF THE SKIN*

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I

ACCORDING to a recent bulletin of the British Ministry of Health¹ 883 certified deaths from cancer of the skin occurred in males in 1928 and 502 in females, bearing a proportion to every 1,000 deaths from cancer in each sex of 34 and 17 respectively. This is exclusive of cancer of the lips and tongue. The skin being the most readily accessible of all organs of the body, and the survival or curability rate in cancer of the skin being higher than in any other organ yet investigated, it is apparent that these figures are much too high.

No argument is needed to support the statement that in all forms of cancer no single factor so greatly contributes to a favourable prognosis as early diagnosis. It is evident then that to reduce the mortality in cancer of the skin we must strive to increase our knowledge and familiarity with potentially and actually malignant skin lesions in their earliest stages. There are a considerable number of abnormalities of the skin in which malignant change may come about. While in some conditions generally regarded as possible precursors of cancer it is impossible to determine clinically the point at which they become malignant, there are certain features for which a vigilant watch should always be kept. When they are observed the burden of proof that cancer is not present is laid heavily upon our shoulders.

Any lesion which presents itself as a local over-growth of tissue, which is persistent, which continues to grow, which is indurated, and, especially in the case of the lip or tongue, not only within its own visible borders but beyond these, and which tends to ulcerate, must not be allowed to escape from observation until its nature is definitely established. The age, sex, complexion, occupation and previous history of the patient, the location of the lesion, and whether it exists singly or in numbers, although of varying significance, are all factors of sec-

ondary importance in determining the diagnosis.

The great majority of cancers of the skin are of the basal-cell type. The squamous-cell carcinoma, while comparatively infrequent, transcends the former in importance, owing to its rapid growth and tendency to metastasize. The mixed or transitional types are still less common, while the melanocarcinomas, although highly malignant, are happily rare.

The *squamous- or prickle-cell carcinoma* usually appears at first as a small warty growth slightly raised above skin level, but occasionally there is no perceptible elevation, or there may even be a slight depression. It may resemble a small, pinkish, or pinkish-yellow, firm, nodular and waxy pimple. It is highly vascular and tiny capillaries often appear upon its surface. In spite of its firm feel it is friable and breaks up readily under the curette. The patient will often describe its origin as a hard pimple which bled when he picked it. As it grows, a hard margin usually covered by scale can be distinguished, often with a crust as well. Removal of the latter discloses a bright red granulating ulcer which bleeds readily. The horny character of the scale which precedes the appearance of the crust is of importance in indicating the squamous-cell growth. The yellow, varnish-like crust indicates a break in the surface and beginning ulceration. An erythematous halo about the lesion appears early. In the course of a few weeks or months its diameter enlarges, with increasingly deep infiltration eventually fixing it to the deeper tissues; the hard edges become everted and undermined, the ulcer is more and more exposed, or covered only by easily dislodged crust, becoming a red, granulating sore with a scanty, glairy secretion. With secondary infection the latter becomes purulent, drying into thicker and darker crusts. It can now no longer be considered an early lesion, and the prognosis is grave. This cancer is seen chiefly in and after middle-age, although it occurs more frequently in younger subjects than the basal-cell cancer. The sites of predilection are the mucous membranes, the muco-cutaneous

* This is the first of a series of articles specially prepared for the Journal on the early diagnosis of cancer. [Ed.]

junctions, especially on the lower lip, the back of the hand, face, nipples and genitalia. It is this type that most frequently appears in x-ray dermatitis, arsenical keratosis and the occupational dermatoses of workers exposed to tar, soot and heavy mineral oils.

The *basal-cell carcinoma* is traditionally distinguished by a very constant feature, the "pearly" nodular border, although this is occasionally seen in other types. It grows very slowly and may take years to reach a size, such as that of a split pea, which leads the patient to seek advice. At earlier stages it may be observed as a small, hard, shiny, pinkish or greyish nodule, with a peculiar pearly sheen. It may be single, varying in size from that of a pin-head to a lentil, but soon appears as a mass of several minute nodules forming a small tumour. With further growth, which is always greater in a lateral than in a vertical direction, the centre becomes depressed. Soon a small scab appears covering a minute ulcer; this is easily, often accidentally, detached, resulting in bleeding. The ulcer is now seen to be surrounded by a well-defined border of more or less coalesced nodules, and having a characteristic "rolled" and beaded appearance. It is crossed here and there by telangiectatic vessels.

There are four or five fairly well defined variations from this typical picture which originate at different stages in its development. At times the waxy, pinhead nodules show very little tendency to configure coalescence, but form a rounded or crescentic constellation. At one margin of this group a number of nodules are seen to be superficially ulcerated and covered with small scabs. Just beyond these new nodules are beginning to make their appearance, while in the wake of the advancing group are a number of cicatricial lesions. The group as a whole presents on a small scale the various stages in the evolution and involution of a basal-cell carcinoma, forming a slowly advancing patch with an irregular shiny surface, sometimes with occasional capillaries meandering over it. Only a small proportion of the total number of nodules are ulcerating at any one time. This appearance is most frequent over the forehead or temples, or elsewhere that the skin is drawn tightly over bony prominences.

In another form the waxy nodule or beaded border formed by coalescence is very inconspicuous, persisting either as an extremely delicate

and tenuous thread-like margin, or occasionally broadening into a ribbon-like, and sometimes definitely raised, border, pinkish-yellow or greyish pink in colour, and preserving the characteristic semi-translucent appearance associated with basal-cell growths. This border may be complete or broken, and encloses an erythematous plaque, sometimes slightly elevated with a dry shiny surface, sometimes partly covered by papery scales or crusts marking small erosions. Such lesions may occur on the head, but are more frequent on the trunk, are often multiple, and may attain a diameter of several inches. They are more frequent in females. While often spoken of as benign, owing to their extremely slow evolution, absence of metastases, and tendency to spontaneous healing, they are none the less cancerous. They may be either mixed or transitional growths from the start, or develop into such, and may suddenly assume malignant character. A sub-type of the plaque variety is that which has been likened to the appearance of a piece of playing-card let into the skin, which is of waxy or ivory-like appearance, with capillaries on its surface.

The nodules may become large, projecting and button-like early in their evolution, and their semi-translucent character may become very pronounced. They form skin-coloured or deeper pink, fleshy, firm, often lobulated, tumours with some dry scalings, or they may be softer, darker in colour, cystic in appearance, and persist in this form for years before commencing to ulcerate. In others again the ulcerative tendency appears early and dominates the picture, producing the terebrant lesion familiarly known as "rodent ulcer."

Subjective symptoms are uncommon in the early stages. Occasionally some itching is remarked by the patient, especially just before ulceration begins.

It is not always possible to distinguish clinically the basal-cell from the squamous-cell growth, and almost impossible to distinguish it from the mixed-cell lesion, which generally assumes the outward characteristics of the basal-cell type. A growth which the patient states has lasted for three or four years is probably baso-cellular, but if it is only a year old and has reached the size of a bean it is more likely squamo-cellular. Inflammatory signs and much new vessel-formation point to the latter. Pusey² considers that the inflammatory changes about

the growth are due either to the elaboration of irritant toxins by the cancer cells invading the connective tissue along the lymph-spaces, or by a foreign-body type of irritation which they set up. A horny ring-like margin and scales, often forming a central horny plug, which must be distinguished from the beaded, waxy margin and soft crusts of the basal-cell lesion, are features almost peculiar to the squamous-cell lesion, while the irregular waxy rolled margin is seldom seen, although occasionally presented by the cancers developing from arsenical keratoses. It is unsafe to reach diagnostic conclusions from the location of the lesion, but certain locations are favoured by one or the other types of cancer. Two roughly parallel lines drawn through the top of the ears and the brows and through the ear-lobes and the upper lip enclose a space within which most lesions appearing will be baso-cellular. This also is the commoner lesion about the ear and in the auditory canal. Squamous-cell cancer appears on the mucous membranes, muco-cutaneous junctions, and the extremities, with rare exceptions in favour of the basal-cell cancer.

When a lesion having clinical basal-cell characters, with a corresponding history, suddenly assumes greater activity and more rapid growth the possibility of the presence of the mixed lesion must not be overlooked. Montgomery³ found that 12.6 per cent of a series of 119 cases of skin cancer were of the mixed or transitional variety. He believes they may originate from a basal-cell growth and be metamorphosed into a baso-squamous cell lesion or even into frank squamous-cell cancer. Since they are relatively resistant to radium and x-rays, and tend to recur and metastasize, their early recognition is important. In 60 per cent of Montgomery's cases they were clinically indistinguishable from the basal-cell lesion. Growths exhibiting the above behaviour should therefore be submitted promptly to microscopic examination.

Cancer of the skin in younger people is being reported with increasing frequency, especially in those with blond complexions, so that it is not safe to exclude it on the basis of age. Nevertheless it is in middle-aged and elderly people that we must regard with grave suspicion every persistent circumscribed lesion, especially about the head, neck and hands, which is chronically inflamed or shows any suggestion of growth

or degenerative change, and when associated with warts, moles, keratoses or fissures.

Two other varieties of skin cancer which remain to be mentioned are fortunately rare.

Paget's disease usually develops about the female nipple or areola, but is found occasionally about the buttocks or genitals, at the umbilicus, in the axilla, and less frequently about other parts of the trunk. It appears first as an intensely red, round, circumscribed plaque, with a granulating surface and a thin viscid secretion. Later it assumes crusts or scales. Burning or itching is complained of. Infiltration increases, ulceration appears, and with it other clinical signs of carcinoma. At the outset it must be distinguished from eczematous forms of dermatitis by its failure to show the slightest tendency to heal, its induration, and the age of the patient.

"Early" can only be a relative term with reference to *melanocarcinoma*. By the time a pigmented mole begins to show the first outward signs of malignant change it is already late. Any pigmented mole may become malignant, but there are certain features which increase this possibility and should be recognized. By many authorities the simple brown mole is regarded as relatively harmless, but the jet-black, or bluish-black mole, with a slaty glint, is to be regarded with apprehension. When it is elevated and button-like, with a precipitous or overhanging margin, and especially when it is on an area such as the sole of the foot or a toe, exposed to pressure, friction and other injury, it presents very dangerous possibilities. Upon the appearance of any subjective symptoms such as itching, or of growth, no time should be lost in dealing drastically with it.

The clinical distinctions between the basal-cell and squamous-cell cancers are important, because when confronted with a suspected cancer of the skin it is advantageous to know how early we have arrived on the scene, and subsequent action may be determined largely upon this knowledge. A differential diagnosis in many cases cannot be made on clinical evidence alone, and resort to biopsy is sometimes necessary. While manipulation of any possibly malignant growth may be dangerous, the risk is not sufficient to prohibit the removal of a small button with a sharp biopsy punch, or an elliptical section with two strokes of a von Graefe knife. This also applies to instances where it is neces-

sary and clinically impossible to distinguish between malignant and non-malignant lesions.

Precancerous dermatoses.—There is a limited number of skin lesions in which malignant change occurs with considerable frequency, and in the nature of which there is believed to be some elements which definitely predispose to cancer. These are: (a) hard warty growths in chronic solar dermatitis in middle and late adult life; (b) similar growths in the rare juvenile condition, xeroderma pigmentosum; (c) similar growths in the condition known as "sailor's skin" or "farmer's skin," the product of the combined effects of solar rays, wind, extremes of temperature, salt spray and dirt; (d) the keratoses and ulcers of radiodermatitis; (e) seborrhœic or senile keratoses on the face and backs of the hand; (f) cutaneous horns; (g) scars following burns; (h) circumscribed thickenings due to irritation from tar and tar-products, mineral oils, etc.; (i) circumscribed patches of extremely chronic skin diseases, such as lupus vulgaris and lupus erythematosus; (j) arsenical keratoses of the palms and soles; (k) leukoplakia of the mouth and lips, and kraurosis vulvæ; (l) chronic ulcers and fistulæ. Wile⁴ stresses the "marked tendency to malignant epithelial degeneration in all conditions in which there is a break in the continuity of normal epithelium." The exact point at which the transition into malignancy occurs is often impossible to detect clinically, and where there is doubt about such lesions resort must be had to the microscope.

The conditions variously referred to as seborrhœic warts, seborrhœic keratoses, senile warts and senile keratoses have been the subject of much confusion of terminology and prognosis in respect to malignancy. Montgomery and Dörfel⁵ differentiate between *seborrhœic* or *senile warts* and *seborrhœic* or *senile keratoses*. The warts occur mainly on the trunk in seborrhœal regions, at first as small yellow spots, gradually enlarging and becoming more deeply pigmented, covered with thin greasy scales, and stippled with minute horny plugs. Some become distinctly verrucous and hyperkeratotic, but only when chronically irritated do they become malignant and give rise to either squamous-cell, basal-cell or mixed-cell cancer. The keratoses, on the other hand, occur on the uncovered parts, especially on the skin of blond males much exposed to weather. They are more circumscribed, flat

or elevated, brownish or greyish in colour, with firmly adherent scales. Transition to cutaneous horns may occur. The presence of an inflammatory halo is the first sign of impending malignancy. This is an undoubtedly precancerous growth, and the squamous-cell type predominates. In the opinion of Savatard⁶ the senile keratoses are not precursors of carcinoma, but actually very slow-growing carcinomata from the beginning. This view is somewhat supported by Molesworth.⁷

THE DIFFERENTIAL DIAGNOSIS OF EARLY SKIN CANCER

There are comparatively few common conditions which are sufficiently suggestive of early cancer to require consideration under this heading. They are certain manifestations of *syphilis*, of *tuberculosis*, of *pyogenic infection* of the skin, and a small group of *benign tumours*.

While it is important to be on the alert for the signs of malignancy in nodular and ulcerative lesions of the skin, and to remember that a lesion proved to be syphilitic or tuberculous may also be complicated with malignant growth, there is no necessity or excuse for using radical therapeutic measures before the lesion has been sufficiently studied to furnish a reasonable certainty that it is malignant. Every dermatologist from time to time encounters cases of gumma, nodular ulcerative syphiloderm, lupus erythematosus, and lupus vulgaris, which have been to a radiologist and without diagnosis subjected to radium or x-ray treatment. Not only is valuable time lost in securing proper treatment for the disease present, and the patient put to needless expense, but the clinical appearance may be so altered as to make subsequent diagnosis unusually difficult. Moreover, in some conditions, such as lupus erythematosus, x-rays or radium may have a definitely harmful effect.

Syphilis.—The chancre attains in a few weeks the size and degree of development for which a carcinoma would require months. The chancre is rarely seen except upon the genitalia, anus, lip and finger-tip. It occurs in young adult life. It does not bleed as readily as carcinoma, and does not present the irregular, waxy nodular border, or dense horny collar, surmounting scale, or central plug, that carcinoma may do. Its floor is irregular and covered with a foul discharge. Regional adenopathy occurs very early in chancre but not in cancer. In the case

of the lip the submental node enlarges rapidly and noticeably. The Wassermann test is positive in almost every case of chancre after the first few days, although it does not of course exclude cancer. By dark-field examination spirochaetes will be found even before the blood becomes positive.

The gumma corresponds very closely to the carcinoma in age-incidence, but develops more rapidly. It is a rounded, firm tumour, without nodular character, which gradually softens in the centre and then breaks down into a foul ulcer with irregular floor and sanious discharge. It is multiple with much greater frequency than the carcinoma. The Wassermann test is positive in the majority of cases, and the clinical response to anti-syphilitic medication is very rapid. A therapeutic test of three weeks will seldom cause a dangerous delay.

Nodular ulcerative lesions are always multiple, their edges sharp and "punched out"; they almost invariably form configurate groups and respond rapidly to anti-syphilitic treatment. Both of these syphilitic lesions commonly arise upon the site of some trivial physical trauma, such as a bruise or abrasion, which is rarely observed as a precursor of a malignant lesion.

Tuberculosis.—The early lesion of lupus vulgaris is rarely observed in adult life. Its colour is dull red to brownish red, and its evolution is usually extremely slow. It is elevated, but oedematous rather than hard, not nodular, does not have a distinctive border, and becomes scaly very early. It causes contractile and destructive scarring, and in the scar tissue as well as in the soft oedematous tumour the characteristic brownish-yellow, so-called "apple-jelly nodules" are easily distinguished. Other varieties of tuberculosis cutis are less common, but usually extremely indolent, of soft consistency, and when ulcerative have a thicker and more abundant discharge. The microscopic picture is usually so typical that it is immediately decisive.

Lupus erythematosus.—This is frequently unrecognized and first treated as cancer. The early lesion certainly often offers some superficial resemblance to cancer, but also has some readily recognizable and very definite points of difference. The flat, slightly elevated, pinkish red disk or plaque, varying in size from that of a grain of wheat to a small coin, first appears usually in early adult life. The sharply-defined, rather abrupt, margin is sometimes

slightly suggestive of the rolled margin of a basal-cell carcinoma, especially when an occasional capillary is seen crossing it, but the plaque is not nodular and does not ulcerate. It becomes covered with a fine, very adherent greyish scale. If this is stripped off some sanguineous oozing may occur, the dilated mouths of sebaceous ducts are seen, or sometimes a stippled appearance due to small keratotic projections from the under side of the scale having been broken off and remaining as plugs in the ducts. The plaques enlarge, clearing centrally, and coalescing with others to form configurate red outlines enclosing white atrophic scarring within their bounds.

Pyogenic ulcers are ulcerative from the beginning and not the end-results of broken-down nodules. They do not usually present indurated floors or margins, although they may have indolent thickened borders. The margins are irregular and flabby and apt to contain small pus-pockets, and the discharge is usually profuse, with a varying amount of itching, burning and throbbing pain.

Granuloma pyogenicum is a bright red, moist, soft, exuberant, fleshy tumour that sometimes grows very rapidly from a small infected wound, and tends to recur unless thoroughly eradicated at first. It may be sessile or have a constricted base, more or less bathed with thin pus, bleeds on the least injury, and is seldom scaly, although a little soft crusting may occur. The face and palm are common sites for its development.

Benign tumours.—*Molluscum contagiosum* is sometimes mistaken for early carcinoma. The lesion nearly always is multiple, of small size, does not grow rapidly or to any considerable dimensions, and occurs principally in children. The base is often constricted so that it appears as a small pink bead stuck on the skin. Its appearance is waxy or pearly, it is firm and elastic, exhibits a small central depression and contains gelatinous or caseous contents which may be expressed through a small incision.

Sebaceous cysts rarely give rise to much doubt in connection with possible malignancy except when infected, when a very close resemblance to carcinoma may be produced. As cancer has been occasionally reported developing in old sebaceous cysts, a biopsy is always advisable in suspected cases.

Colloid milia sometimes resemble the pearly nodules of basal-celled cancer, especially when,

as occasionally happens, they are closely aggregated to form a small plaque. They are usually pin-head in size, discrete, and occur in large numbers on the faces of women with seborrhœal skins. They are white or pale yellow, hard, grow very slowly up to a large pin-head size, and produce no inflammatory reaction. They can easily be picked out of the superficial layers of the epidermis with a Hagedorn needle. They

are harmless and only of significance as a cosmetic blemish.

REFERENCES

1. Circular 1186. Ministry of Health, April 30, 1931.
2. PUSEY, W. A., *The Principles and Practice of Dermatology*, 4th ed., Appleton, New York, 1924, p. 1057.
3. MONTGOMERY, H., *Arch. Dermat. & Syph.*, 1928, 18: 50.
4. WILE, U. J., *J. Am. M. Ass.*, 1930, 94: 382. Discussion of paper by Eller and Anderson).
5. MONTGOMERY, H. AND DORFFEL, J., *Arch. f. Derm. u. Syph.*, Sept. 22, 1932.
6. SAVATARD, L., *Arch. Dermat. & Syph.*, 1931, 24: 835.
7. MOLESWORTH, E. H., *Med. J. Austral.*, 1932, 2: 196.

DETERMINATION OF THE ACTIVITY OF RHEUMATIC INFECTION IN CHILDHOOD*

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MANY observations have been made on the various phenomena which indicate activity in rheumatic infection. Taken singly, no one of these has yet offered unquestionable evidence of the inactivity of the disease. Our endeavour has been an attempt to estimate the value of several of these observations made concurrently on the same individual. They are:— the variations in the white blood cell count; the sleeping pulse rate; the sedimentation rate of the red blood cells; the variations in the mouth and rectal temperatures; the body weight; the albumin-globulin ratio. From them we desire to draw certain conclusions.

The variation in the white blood cell count in the presence of rheumatic infection has been the subject of considerable literature,¹ which we do not intend here to review, save to conclude that it has been accepted by many that in the presence of activity of a rheumatic infection there is consistently an increase in the total leucocyte count. Secondly, Schlesinger,² has recently shown that there is a consistent slowing of the sleeping pulse rate compared with the waking pulse rate in cases of rheumatic infection without carditis, from which he concludes that the sleeping pulse rate may be used to differentiate between cardiac infection and emotional states causing tachycardia, and that the presence of a normal sleeping pulse rate in rheumatic infection is indicative of the absence of cardiac com-

plication. It is recognized, also, that most children suffering from active cardiac infection do not maintain their body weight, and that the presence and maintenance of normal nutrition after rheumatic infection is probably indicative of cessation of its activity.³

Many observations have been made on the sedimentation rate in the presence of rheumatic infection and it is not our intention to review this literature here (Peterman and Seegar,⁴ Landau⁵). We are aware that there are many possible fallacies in the technical performance of this observation; that it is dependent on the albumin-globulin ratio, the total protein of the blood, and is altered in anæmic states, etc. However, certain very interesting observations on children with cardiac lesions have recently been made by Payne,⁶ and we have attempted to repeat his work, using essentially the same technique, with some slight modifications. The mouth and rectal temperatures were taken simultaneously, to determine if there is an actual difference between them in childhood, and to ascertain if they tend to approximate each other in the presence of local inflammation in the throat, *i.e.*, tonsillitis. In most cases we have also estimated the albumin-globulin ratio, to see whether there was any consistent alteration in this ratio in the presence of rheumatic infection. All cases have, of course, had routine red blood cell counts. We have attempted to correlate the findings resulting from these various estimations. All the observations have been made either once or twice a week by the same individual, using the same technique, under similar circumstances.

* From the Medical Service of the Children's Memorial Hospital, Montreal, Canada.

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SEDIMENTATION RATE: TECHNIQUE

"The apparatus required is a pipette graduated at 0.1 and 0.5 c.c. (an ordinary straight 1 c.c. pipette, graduated in 0.01 c.c., is quite suitable), a small glass capsule or test-tube, a block of wood with a lump of plasticene stuck firmly on it, and finally some thin glass capillary tubing with an internal bore of between 1.6 and 1.9 mm. This is cut into lengths of about 12 cm. and a mark is made exactly 10 cm. from one end. A solution of 3.8 per cent neutral sodium citrate in water is the only reagent needed. 0.1 c.c. of this solution is sucked into the graduated pipette." (Instead of stabbing the finger as described by Payne, we have found it more satisfactory to puncture the median basilic vein with a small No. 24 hypodermic needle). The rate of blood flow may easily be regulated by pressure about the arm. In our experience it is less painful, the children preferring this method to stabbing; and one is assured of a free and continuous flow of blood as required. We have done as many as 37 punctures on a single vein without objection on the part of the patient or any difficulty in obtaining the blood). The blood is collected straight into the pipette by capillary action until full to the 0.5 c.c. mark. The citrate and blood are then discharged into the glass capsule, mixed, and sucked up into the pipette again. One of the capillary tubes is now stuck horizontally on the plasticene and the blood is run into it up to the 10 c.c. mark. Still keeping it horizontal, the tube is pushed into the lump of plasticene, which thus seals the lower end of the tube, and without withdrawing the tube from the plasticene it is rotated into the vertical position and the time is noted. The level of the blood is now above the 10 c.c. mark, owing to the plug of plasticene pushing it up. After standing, it will be seen that the red cells have fallen, leaving a clear column of plasma. The height of this clear column is measured in mm. after one hour, and, if desired, again at 2 and 24 hours. (We have taken the readings at one and two hours respectively). The first measurement gives sufficient information, but in severe cases the reading at the end of half an hour is instructive. The reading at one hour with this method, using venous puncture, is normally from 5 to 8 mm. and values over 12 mm. can be considered abnormal.

Since changes in temperature influence the sedimentation rate, one should keep the tubes standing away from sources of heat, and in summer place them in a cool corner of the room. The tubes must be kept vertical after setting up. The collecting pipettes should be cleaned in the same manner as a blood count pipette. The capillary tubes are discarded.

Nicholson⁷ states that, "In blood containing an anticoagulant, the cells settle, leaving a clear plasma. This sedimentation is more rapid in disease than in health. A measurement of its rate is of value in diagnosis and prognosis. Dilution of the blood with plasma greatly increases the sedimentation rate, by giving a more open path through which the cells may fall, so that individuals with low blood cell counts and cell volume percentage have a rapid settling time. Other factors being equal, the cell settling time is, roughly, inversely proportional to the cell volume percentage. An increased sedimenta-

tion rate indicates destruction of body tissues." Payne says, "Broadly speaking, anything that allows the red blood cells to lose their electric charge will allow them to agglutinate. The plasma fibrinogen, and, to a lesser extent, the plasma globulin are both proteins that tend to allow the red blood cells to discharge their electricity, but the plasma albumin acts in the opposite manner. An increase in the fibrinogen, or a decrease in the albumin-globulin ratio, will therefore tend to increase the sedimentation rate, and one or both of these changes are usually found in practice when the sedimentation rate is increased."

It has been alleged that certain properties of blood proteins (albumin-globulin, fibrinogen) other than density, solubility and size of the particles, may alter the sedimentation rate of the red blood cells. If so, it is important not only to correlate the sedimentation rate with the total protein and the absolute values of the different blood proteins but also their relative values. This implies the determination of the albumin-globulin ratios. As yet our data on this phase of rheumatic infection are quite insufficient. That disturbance of water equilibrium may be a factor is suggested from the occasional finding of excessive values for the total blood protein. We have records of as much as 10 per cent, and technical errors have been excluded. Estimation of the total protein is a simple procedure and differs from the many variables which must be considered in the estimation of albumin-globulin and fibrinogen. These high protein values are generally met with with high red blood cell counts, suggesting temporary loss of water from the general circulation, as there is no sweating, polyuria or loss of weight during these periods. It is obvious that these high values are not due to loss of water but merely due to shift of water from the circulation to other stores in the body. We propose making further observations on the albumin-globulin ratios in rheumatic infection.

The material reviewed here consists of 31 cases of obvious rheumatic infection admitted to the Children's Memorial Hospital, Montreal, during the past year, on whom 573 determinations of the sedimentation rate and 298 white blood cell counts have been made, from September, 1932, to May, 1933, as part of the hospital routine. These children were all ill, and owing to the necessities of an active service have not

in all cases been held in hospital until these observations could be carried to a definite conclusion; hence we propose continuing this work further. However, certain conclusions are permissible.

The material has been divided into five groups.

Group one (controls).—Two cases of congenital heart disease with normal sedimentation rates, blood counts, sleeping pulse and albumin-globulin ratios, showing that the results of the technique employed correspond with previous observations. A third child, admitted for the treatment of tapeworm, showed some disturbance of his blood count and sedimentation rate, associated with the marked dehydration and loss of weight following the use of anthelmintics and purgatives. Fourthly, a child suffering from thallium poisoning, of which the chief manifestation was a toxic arthritis, showed no disturbance of the various factors in this observation. Fifthly, a child suffering from influenza showed a high sedimentation rate, leukopenia, and an increase in the sleeping pulse, all of which came rapidly to normal with recovery from the infection.

Group two consists of 6 cases of acute rheumatic fever (arthritis), not complicated by carditis. The subjects in this group showed an initial high sedimentation rate, rapid sleeping pulse during the presence of fever, loss of weight, some secondary anaemia, and leucocytosis. In the absence of complicating carditis there is a striking uniformity in the rapidity with which all these factors return to normal; the sedimentation rate and sleeping pulse rate fall rapidly with the signs of clinical improvement, the usual leucocytosis returns to normal, and the lost weight is regained. All these factors support the clinical observation of uncomplicated recovery. Certain cases showing leukopenia will be discussed separately. (See Chart 1).

Group three concerns 7 uncomplicated cases of chorea. The children in this group showed consistently no alteration in the sedimentation rate, very marked stability of the sleeping pulse rate, a normal white count, very little secondary anaemia, no alteration in the albumin-globulin ratio, and they almost consistently gained in weight while under treatment in the hospital. All these signs point to inactivity of the rheumatic infection and concur in the clinical evi-

dence of absence of cardiac complication. It is a very striking commentary on our belief in the rheumatic basis of chorea and its infective nature that none of these observations give evidence in support of it. Yet, we do believe that chorea is rheumatic in origin because of the frequency of its complications, which are apparently of the same nature as the complications of rheumatism of the arthritic type. We made repeated observations on the spinal fluid of these children, finding it normal as regards its total protein, chloride and cell count. We find it difficult to believe that the manifestation of rheumatic infection which we term "chorea" has any inflammatory basis (Chart 2).

Group four.—Fifteen cases of acute rheumatic fever complicated by carditis. In this group we found, as have others, that there is a persistently elevated sedimentation rate, usually of high degree, a moderate leucocytosis, little or no difference in the alert and sleeping pulses, and usually loss of weight. Of these alterations, the leucocytosis, weight, and pulse tend to return to normal with the cessation of clinical activity. The sedimentation rate, however, persists at a high level over a long period of time, usually months (Chart 3). Many of our cases were discharged before the sedimentation rate reached normal; several were re-admitted with evidence of re-activity of their infection, indicating that the infection was still active at the time of discharge from hospital. Landau apparently has found similar results, and he makes the following statement: "In cases of acute polyarthritis and cardiac disease at the Gothenburg Hospital for Children we have consistently adopted the principle of not releasing patients from bed until microsedimentation has shown normal values after repeated tests, irrespective of whether or not the body temperature has become normal. We have found that these patients generally retained their normal sedimentation even after getting up; the transition from lying in bed and being up has not, in such cases, had any noticeable effect on microsedimentation. After their discharge from the hospital, microsedimentation tests have generally been made on these patients in the polyclinics, and I venture to assert that when the sedimentation values were normal at the time the patients were sent home, they continued so in the great majority of cases; hitherto we have had relapses in polyarthritis

or endocarditis in only a few cases. On the other hand, many patients who, owing to various causes, were dismissed with increased microsedimentation had to be admitted again sooner or later owing to an outburst or a progression of the process."

As is noted in the group to follow, these observations are to be discounted in the presence of cardiac failure with œdema. When œdema occurs the weight increases, the sedimentation rate falls abruptly to levels below normal, the sleeping pulse rate and the white blood cell

count tend to rise. Occasionally the sedimentation rate falls very abruptly just before the onset of clinical œdema and is of grave prognostic import. With this onset of œdema there is also marked alteration in the albumin-globulin ratio (Chart 4).

Group five.—Three cases of chorea complicated by carditis show in all respects, excepting the white blood cell count, a similar picture to Group 4. In our cases, leucocytosis was not a constant finding in chorea complicated by carditis (Chart 5).

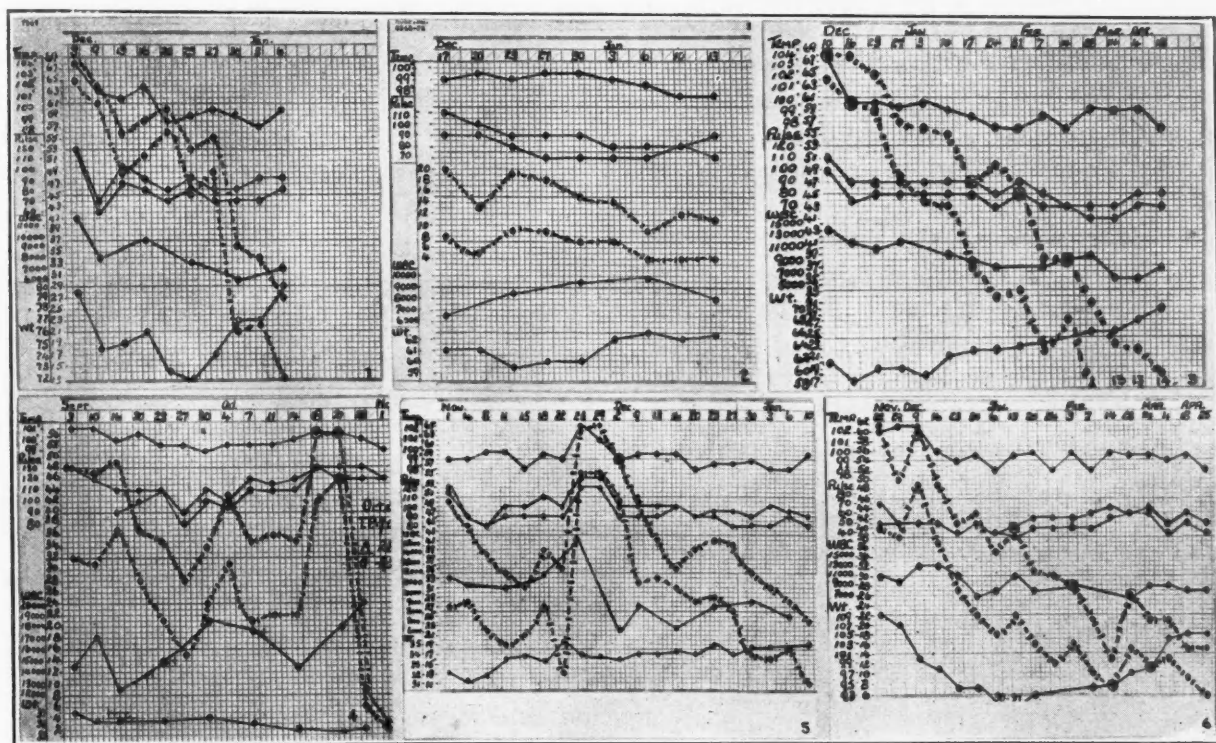


CHART 1.—(Hosp. No. 7967). R.S., a male, aged 12 years, admitted with acute rheumatic fever, having had wandering joint pains with redness and swelling for one week before admission. Clinically improved and comfortable by December 10, 1932. Discharged as an uncomplicated case of rheumatic fever.

CHART 2.—(Hosp. No. 8242/33). K.C., a female, aged 10 years, admitted with chorea, which had been present for two weeks before admission. No evidence of carditis. Discharged in April, having gained weight; no change in the sedimentation rate and other criteria since admission. No evidence of chorea or carditis.

CHART 3.—(Hosp. No. 8134/32). A.D., a male, aged 10 years, history of rheumatic fever and carditis in 1930; re-admitted with recurrence of rheumatic fever. Still in hospital; no pain after December 12th; no alteration of cardiac signs; nodules February 6th to February 21st, with falling sedimentation rate.

CHART 4.—(Hosp. No. 4247/32). A.C., a male, aged 4 years, pneumonia in July, 1932. After recovery he developed tonsillitis, which subsided in a few days. Following a "silent period" of ten days, patient developed carditis on August 7th, arthritis and pleurisy with effusion (rheumatic) on August 9th, nodules on August 15th, and pericarditis on August 22nd. No clinical evidence of activity in September. Acute follicular tonsillitis, nodules, and pericarditis on October 16th. No evidence of œdema on October 21st; marked œdema October 28th. Patient died on November 1, 1932, with very marked œdema.

CHART 5.—(Hosp. No. 8733/33). F.R., a female, aged 6 years on admission, acutely ill with hemichorea (paralytic) and carditis, vomiting and diarrhoea. Discharged, chorea having subsided on December 20th; cardiac murmurs as on admission, showing an increase in the transverse diameter of the heart; headache and abdominal pain November 24th and 26th.

CHART 6.—(Hosp. No. 7680/32). D.F., a male, aged 12 years. Previous attack of rheumatic fever and carditis with heart block, 1931. Re-admitted with recurrence of rheumatic fever and heart block. Discharged, clinically inactive with partial heart block—ambulant.

* In all the charts the sedimentation rate is indicated by dots and dashes. The upper and lower lines indicate the sedimentation rate in mm. in 2 hours and 1 hour, respectively. The first solid line indicates the temperature; the next two, the alert and sleeping pulses; the next, the white blood cell count, and the lowest solid line indicates the weight.

COMMENT

From these observations, we cannot concur in the belief that the absence of leucocytosis signifies inactivity of the rheumatic infection. Several cases of activity, as judged by other criteria, showed normal white blood cell counts.

Two cases of acute rheumatic fever complicated by carditis showed a striking leukopenia, one of 3,400 cells, which persisted for several observations, and one of 3,250 cells, associated with evidence of arthritis, pericarditis and pneumonia, with an intermittent fever of 101 to 104°. This is distinctly unusual and we have no explanation. Also, one case of severe erythema multiforme with pericarditis showed a persistent leukopenia in the presence of a high and remittent fever. This child was removed from the hospital against advice, and has since died from cardiac failure.

Our observations on the pulse rate confirm Schlesinger's that the presence of a normal sleeping pulse rate in chorea practically precludes the presence of carditis. We frequently noted the presence of tachycardia in the alert state which during sleep was not present. This is to be explained as an emotional effect due to the disease.

From these observations it would appear that the sedimentation rate is of value in demonstrating the absence of cardiac complication in chorea when it remains persistently normal. Similarly, the sedimentation rate, when persisting at a high level in the absence of clinical evidence of carditis, may be of value in demonstrating the likelihood of oncoming cardiac complication in rheumatic fever. In well established cardiac disease, well compensated, the sedimentation rate may fall to and remain normal after the subsidence of the infection, demonstrating that the cardiac signs present are not indicative of active cardiac infection, but rather of healed disease leaving a damaged cardiac mechanism.

As the charts show, there is a definite difference between the mouth and rectal temperatures, observed simultaneously, in almost all these children, usually of about one degree. It has been noted by DeBuys⁸ that in the presence of acute infection of the throat the mouth and rectal temperatures tend to approximate each other. This we were able to confirm in two cases, where in the presence of acute tonsillitis in these rheumatic children the rectal and mouth temperatures were equal. With this exception

the rectal temperature was consistently 3/5ths to one degree higher than that of the mouth.

Steady increase and maintenance of the body weight in the absence of œdema is of good prognostic import, and signifies inactivity of the rheumatic infection. Observations on the blood pressure were taken weekly, but tended to vary so greatly, presumably due to emotional disturbances and change in personnel, that we considered them of little clinical value; hence they are not here reported. We have noted that after an acute exacerbation of rheumatism the sedimentation rate seems to fall more quickly and remain at a lower level after rheumatic nodules appear, suggesting that the presence of rheumatic nodules is a terminal phase of the infection.

CONCLUSIONS

1. Congenital heart disease shows no noteworthy alteration of the white blood cell count, the sedimentation rate, the sleeping pulse, and the body weight.

2. Acute rheumatic fever, uncomplicated, shows a high sedimentation rate, usually a leucocytosis of 12,000 to 15,000, fever, approximation of the sleeping and waking pulses during the period of fever, and loss of weight. All these evidences of activity tend to subside *pari passu* with the clinical evidence of subsidence of the infection.

3. Chorea without carditis shows no alteration in the total white blood cell count, sedimentation rate or fever; there is usually a marked difference between the sleeping and waking pulses, the former being normal. Under treatment there is usually a gain in weight.

4. Rheumatic fever with carditis shows marked alteration of the sleeping pulse, white blood cell count, and body weight, which tend to return to normal with the subsidence of the infection. The sedimentation rate, however, requires a period of months to return to normal, and hence is probably the most delicate of these tests in the determination of activity of rheumatic infection, excepting in the presence of cardiac failure with œdema, when it falls rapidly to levels below the normal and is of grave prognostic import.

5. Chorea complicated by carditis, even in the absence of fever, shows the same changes in these criteria as does rheumatic fever with carditis, excepting the absence of leucocytosis.

We wish to express our gratitude to the Nursing Staff of the Children's Memorial Hospital, particularly to Miss Madeleine Flander, R.N., whose hearty cooperation made these observations possible.

REFERENCES

1. SEVIST AND MILLER, *J. Clin. Invest.*, 1924, 1: 197.
WILSON AND KOPEL, *Am. J. Dis. Child.*, 1926, 32: 46.
2. SCHLESINGER, *Quart. J. Med.*, 1932, 1: 67.
3. MCCULLOGH, Personal communication.
4. PETERMAN AND SEEGAR, *Am. J. Dis. Child.*, 1929, 37: 693.
5. LANDAU, *Ibid.*, 1933, 45: 691.
6. PAYNE, *The Lancet*, 1932, 1: 74.
7. NICHOLSON, *Laboratory Medicine*, Lea & Febiger, Phila., 1930, p. 77.
8. DEBUYS, Personal communication.

TORTUOSITY OF THE INTERNAL CAROTID ARTERY AND ITS RELATION TO TONSILLECTOMY

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TONSILLECTOMY is probably performed more frequently and with less mortality than any other surgical procedure. StClair Thompson¹ records 10,000 tonsillectomies on children without a single fatality. That this is not due entirely to modern technique was borne out by De Santi² as early as 1894. This fact is all the more remarkable when we keep in mind that the operation is performed not only by the skilled surgeon but by practitioners generally. This immunity from fatal accidents is apt to lull the operator into a feeling of unwarranted security. That grave accidents may occur should be borne in mind and the most serious of these is fatal hæmorrhage.

Sebileau³ states that it is impossible to remove the tonsil without provoking some hæmorrhage. The bleeding may be confined to the tonsillar fossa or arise from a vessel lying outside of the fossa. The former condition is usually easily controlled: the latter, though rare, is always serious and may rapidly become fatal.

The normal internal carotid artery lies about one inch posterior and lateral to the tonsil, and is out of danger in tonsillectomy if the surgeon confines his manipulations to the tonsillar fossa. This point is stressed by Thompson.¹ Campbell⁴ states that "it is impossible to wound the internal carotid artery in tonsillectomy." Sir Frederick Treves⁵ maintains that it is "in comparatively little danger of being wounded when the tonsil is excised." According to Groves,⁶ "the danger of wounding the internal carotid artery is quite mythical since the vessel lies three-quarters of an inch away from the bed of the tonsil, the other side of the pharyngeal wall."

The teaching of anatomists and surgeons was until fairly recently that the internal carotid artery lies lateral to the tonsil. This error still persists in the minds of some and is present in the last edition of Buchanan's anatomy.⁷ John Cairney⁸ has given a fairly complete summary of the correct concept for English authors. He claims that the first correct statement of the relation between the internal carotid artery and the tonsil was made by Hart in 1853. Sebileau³ in his review of the French literature on the vascular relations of the tonsil states that it was A. Zuckerkandl (1887) who first pointed out that the internal carotid artery lies 2 cm. posterior to the posterior pillar of the fauces. Zuckerkandl's researches were confirmed five years later by those of A. Rieffel.

We may aver that the internal carotid artery when normally situated is in very little danger of being injured in tonsillectomy. However, the artery may be abnormally placed. The conception of the earlier anatomist was that the internal carotid artery is usually sinuous in its cervical portion^{25, 26, 27}; the modern teaching is that it takes a fairly straight course in the neck, but may be tortuous near the base of the skull.²⁸ Tortuosity of this portion may vary in degree, from a mild sinuosity to the formation of actual loops and coils. If the flexures are slight they may not reach the area of the pharynx which lies lateral to the tonsil, but in greater degrees of tortuosity segments of the artery extend so far forward as to lie directly lateral to the tonsil, separated from it by the superior constrictor of the pharynx and the capsule of the gland. In this position it is in great danger of being injured in tonsillectomy, and on examina-

tion can be palpated or seen as a pulsating tumour protruding into the pharynx.¹¹

Fortunately, the anomalous coils or sigmoid formations are not always in relation to the tonsil. Out of 12 cases Cairney⁸ examined, in 2 the tortuous segments did not come nearer to the tonsil than the normal artery. They may occur in either the coronal or the sagittal plane. The clinical appearance of the former is well illustrated in Figs. 1, 2 and 3; Figs. 4, 5 and 6 illustrate the latter. In Fig. 3 the artery is forming a direct lateral relation to the tonsil, in 4 and 5 it is situated above the level of the

soft palate. Fig. 6 illustrates the various degrees of tortuosity which occurred in 10 cases collected by John Cairney.⁸ The condition which we met with in a subject in the dissecting room of the Manitoba Medical College during the session of 1933 is described below. It was limited to the left internal carotid; the right artery was quite normal in its course and position.

The subject was a male, aged 72, very obese; the cause of death was dementia præcox. The coil in the artery occurred in the sagittal plane above the level of the soft palate. The artery arose from the common carotid, slightly above the level of the upper border of the thyroid cartilage. It ascended in a fairly direct manner for 35 mm., then it turned backwards

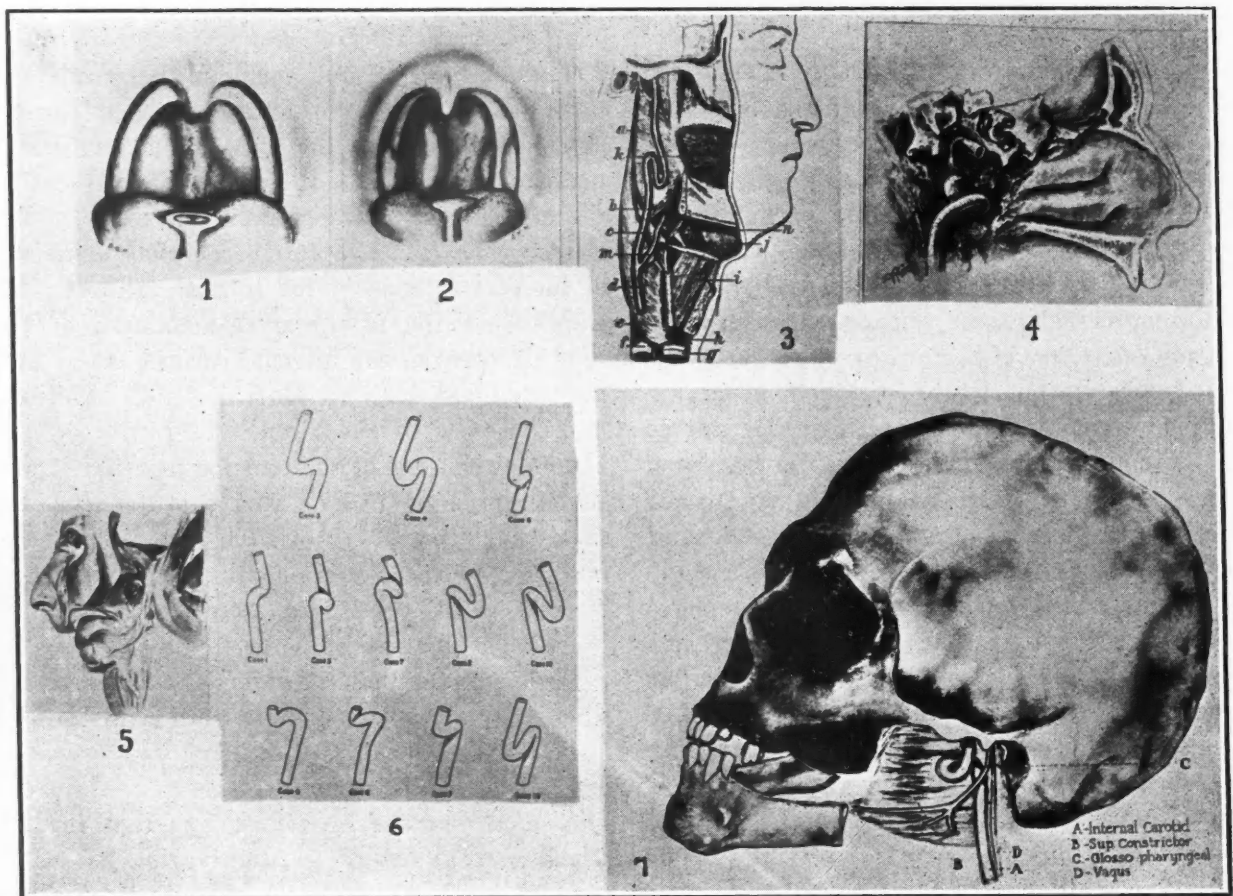


FIG. 1.—(Brown Kelly). Very prominent artery on both sides of the pharynx.

FIG. 2.—(Brown Kelly). Prominent vessel on right side passing over posterior wall, and on left side bulging lateral wall of pharynx.

FIG. 3.—(Fisher). Tortuosity of the internal carotid lies in the sagittal plane. The unshaded area on the superior constrictor muscle covers the area of the inner surface occupied by the tonsil. a, superior constrictor; b, internal carotid artery; c, middle constrictor; d, common carotid artery; e, inferior constrictor; f, œsophagus; g, trachea; h, crico-thyroid muscle; i, thyreo-hyoid muscle; j, mylo-hyoid muscle; k, buccinator muscle; l, tensor tympani; m, external carotid artery; n, hypoglossus muscle.

FIG. 4.—(Skillern). Sigmoid tortuosity of the left internal carotid artery. Pharynx removed but relation to the palate can be seen.

FIG. 5.—(Cadarsó and Goyanes).

FIG. 6.—(Cairney). Tortuous internal carotids in the adult (seen from the front). Upper row, cases in which the first bend is medial; all specimens from the right side. Middle and lower rows, cases in which the second bend is medial; middle row are specimens from the right side; lower row from the left side.

FIG. 7.—Tortuous left internal carotid artery forming a complete coil which is situated on the superior constrictor muscle and above the level of the soft palate.

and slightly medially for 4 mm., to pass forwards and slightly upwards for a distance of 10 mm. Then it continued a curved course for 13 mm., twisting at first laterally and downwards, then upwards and backwards, thus forming a complete coil. From this point it bent upwards and ascended in line with the lower cervical segment to the base of the skull, where it disappeared by entering the carotid canal.

The majority of the cases described have been met with in the dissecting room,^{8, 9, 10, 12, 13, 23, 24} but a fair number have been observed clinically. We believe that Farlow¹⁵ was the first to recognize and describe this condition in the living subject. In 1887 he presented 5 cases, 3 of which were in girls 4, 13 and 18 years of age respectively, and 2 were in women, 23 and 30 years of age. In his remarks he says "This condition must be rare, for I find no mention of it in the literature." He thought, however, that the aberrant artery was the ascending pharyngeal. He gives this warning, "In all cases where possible it is advisable to examine with the finger, before operating, to see whether an artery of abnormal size or situation is present."

Brown Kelly¹¹ collected 150 cases presenting pulsation in the pharynx. In 85 cases it was bilateral, in 65 cases it was unilateral. Ninety-one were in females, 59 were in males. The age-grouping was as follows: 3 were children under 5 years of age; 27 were under 15 years of age; and 22 were over 60. The condition occurred more often on the right than on the left side. Sack¹⁶ describes the condition in a girl 10 years of age, whose only symptom was a tickling in the throat. On examination of the pharynx the author states that he saw in the left pharyngeal wall an arch-formed strongly pulsating vessel, 5 to 6 mm. thick. Other cases have been reported; Connolly¹⁷ in a boy aged 5; Wood,¹⁸ a girl aged 5 and a boy aged 7; Demme, reported by Skillern,¹³ in an examination of 10,000 patients observed pulsations in the pharynx in 2 per cent.

Fatal hæmorrhage following tonsillectomy due to injury of the internal carotid artery, though rare, should always be kept in mind by the operator as a possibility. De Santi² states that it is almost unknown. Sebileau³ describes 6 cases of death from fatal hæmorrhage following operations upon the tonsil, all of which were performed by skilled surgeons. A case of death following tonsillectomy described by Hamer and reported by Connolly¹⁷ occurred in the Metropolitan Hospital. At the post-mortem which followed it was found that "the

girl had two complete coils in the internal carotid arteries, and these coils pushed in towards the middle line, under the posterior wall of the pharynx; in cutting off the tonsil one of the coils had been completely removed." In the Paris letter of the *Journal of the American Medical Association*¹⁹ the reporter states that Dr. Sebileau described the death of a young girl from hæmorrhage following tonsillectomy performed by an expert surgeon, who had performed more than 500 tonsillectomies. At autopsy a large tear was discovered in the internal carotid artery. Skillern gives this timely warning, "Before operating the surgeon should Stop, Look and Listen. A thorough ocular and digital exploration of the pharynx for arterial pulsations should never be omitted."

The etiology of this abnormal condition of the internal carotid artery is by no means entirely clear. Three theories have been advanced: (1) That it is due to atherosclerotic changes in the artery itself; (2) that it is a regressive phenomenon, and is perfectly intelligible in the light of comparative anatomy; (3) that the cause is embryological.

In support of the first theory Moorehead⁹ says "Tortuosity is, I believe, the result of atheroma or of arteriosclerosis, and the internal carotid artery presents the twist in a marked degree because it is firmly fixed above in a bony canal." Rowlands and Swan¹² also incline to this explanation, because in their cases the arteries were generally atheromatous. Fisher,¹⁰ on the other hand, claims that the artery in the case he described showed but slight atheroma. Cairney⁸ is of the opinion that in his cases arteriosclerosis was insufficient to cause the change. In the case we have described above there is on microscopic examination of both internal carotid arteries considerable atherosclerosis present, but this is not more marked in the tortuous artery of the left side than in the normal artery of the right side. The fact that the condition has been recognized and described so frequently in children^{11, 14, 16, 17, 18} is a strong argument against the arteriosclerotic theory. Yet in the face of all this evidence to the contrary, Adachi²⁰ is of the opinion that the condition is a senile change.

According to Fleming²¹ the anomaly can be explained on the grounds of comparative anatomy. In discussing the rete mirabile, which is a

plexiform arrangement of the internal carotid artery found in some grazing animals, he says "The same object is sometimes attained by great tortuosity, as we have already seen in the description of several arteries. Perhaps the most marked example, however, is to be found in the carotid artery of the seal, which is nearly forty times longer than the space which it has to traverse." Cadarso and Goyanes¹⁴ examined the internal carotid artery in ten seals, to test the accuracy of Fleming's statement, and found that the artery in the seal is "noteworthy for the directness of its course." They further point out that the literature does not substantiate Fleming's statement. According to the opinion of these investigators and others²⁰ the condition is not due to a reversion to type.

The most likely explanation, it seems to us, is the embryological one, which has been advanced by Kelly.¹¹ As is well known, the internal carotid artery is formed from two embryological arteries. The lower part of the vessel is from the third aortic arch and the upper part is from the dorsal aorta. Where these two parts become continuous a bend in the vessel occurs and at this point it is crossed superficially by the glossopharyngeal nerve. Due to the development of the lungs there occurs a descent of the heart and this usually straightens out the bend. If, however, as Kelly points out, there is a greater relative growth of that part of the artery which arises from the third arch this angulation may persist. Since this portion of the artery is surrounded by loose areolar tissue, it is free to assume as age advances the various formations which we have described. It is noteworthy, and in support of this theory, that these flexures always occur in that part of the artery crossed by the glossopharyngeal nerve.

The main points in the diagnosis according to Kelly are: (1) a smooth and not very pronounced bulging, pulsating synchronously with the heart and covered with healthy mucous membrane; (2) its situation in the posterolateral region of the pharynx and mainly on a level with the tonsil; (3) its frequent bilaterality; (4) the absence of symptoms attributable to it; (5) its identification as the internal carotid by palpation and pressure; (6) its unchanging size over periods of months and years.

While sinuities of the internal carotid artery are fairly common, tortuosities to the extent of

forming a complete coil, as that in the dissection herein described, are relatively rare, there having been reported, so far as we can ascertain, only four cases.^{13, 14, 17, 23}

Although the internal carotid artery and other aberrant arteries which may occur in the region of the tonsil may lead to fatal hæmorrhage in tonsillectomy if not recognized beforehand, their detection is so easy that if ordinary care is taken no fatal accidents from hæmorrhage in tonsillectomy should ever occur.

SUMMARY

1. Fatal hæmorrhage following tonsillectomy is usually due to the injury of an aberrant internal carotid artery in the region of the tonsillar fossa, and it is an eventuality which the operator should not disregard.

2. The normal position of the internal carotid artery is $\frac{3}{4}$ to 1 inch posterior and lateral to the tonsil, and not lateral to the tonsil as has been taught in the past.

3. An examination of the literature shows that the internal carotid artery is frequently sinuous in its cervical portion, to such an extent as to form complete coils which may be situated in the sagittal plane and extend as far forward as the tonsil or in the coronal plane, and extend to the middle line of the posterior wall of the pharynx.

4. Such anomalies of the internal carotid may be unilateral or bilateral.

5. A dissection of the left internal carotid artery which formed a complete coil in the sagittal plane above the level of the soft palate is described.

6. Examples from the literature representing this condition both in the cadaver and in the living subject are given.

7. The cause of the anomaly herein described is probably embryological, and not pathological or regressive, as some investigators have maintained.

8. A correct diagnosis is formed on a consideration of the situation of the pulsating tumour, the healthy appearance of the mucous membrane, and a determination of the fact that the tumour is a part of the internal carotid by palpation and pressure.

We wish to express our thanks to John Hoogstraten, who made the drawing of Fig. 7; and to Prof. R. G. Inkster for his interest and criticism.

REFERENCES

1. THOMPSON, STCLAIRE, Diseases of the nose and throat, Cassell, London, Third Ed., 1926, p. 379 *et seq.*
2. DE SANTI, P. R. W., *The Lancet*, 1894, 1: 83.
3. SEBILEAU, M. P., *Bull. et Mém. Soc. de Chir. de Paris*, 1921, 47: 1.
4. CAMPBELL, W. F., A Text Book of Surgical Anatomy, Saunders, Phil., Third Ed., 1922, p. 143.
5. TREVES AND CHOYCE, Surgical Applied Anatomy, Cassell, London, 8th Ed., 1926, p. 189.
6. GROVES, E. W. H., A Synopsis of Surgery, Wright & Sons, Bristol, 7th Ed., 1925, p. 370.
7. BUCHANAN, Manual of Anatomy, Baillière, Tindall and Cox, London, 5th. Ed., 1930, p. 1286.
8. CAIRNEY, J., *J. Anat.*, 1924-25, 59: 87.
9. MOOREHEAD, T. G., *Brit. M. J.*, 1902, 1: 332.
10. FISHER, A. G. T., *The Lancet*, 1915, 2: 128.
11. KELLY, A. B., *J. Laryngol. & Otol.*, 1925, 40: 12.
12. ROWLANDS, R. P., AND SWAN, R. H. J., *Brit. M. J.*, 1902, 1: 76.
13. SKILLERN, P. G., *J. Am. M. Ass.*, 1913, 60: 172.
14. CADARSO, A. R. AND GOYANES, J. J. B., *J. Anat.*, 1925, 60: 119.
15. FARLOW, J. W., *Boston M. & S. J.*, Mar. 31, 1887, 302.
16. SACK, N., *Monatschr. f. Ohrenh.*, 1907, 41: 277.
17. CONNOLLY, J. H., *Proc. Roy. Soc. Med.*, (Laryngol. sect.), 1913, 7: 25.
18. WOOD, G. B., *Am. J. M. Sc.*, 1902, 124: 478.
19. Paris letter, *J. Am. M. Ass.*, 1921, 76: 532.
20. ADACHI, B., Arteriensystem der Japaner, Kaiserlich-Japanische Universität zu Kyoto, 1928, Bd. 1, 97.
21. Chauveau's Comparative Anatomy of the Domesticated Animals, translated and edited by Geo. Fleming, Appleton, New York, 2nd Eng. Ed., 1898, p. 680.
22. BELL, JOHN, The Anatomy of the human body, Collins and Perkins, New York, 4th Ed., 1809, 2: 187.
23. SMITH, G. M., *Brit. M. J.*, 1902, 1: 1602.
24. EDINGTON, G. H., *Brit. M. J.*, 1901, 2: 1526.
25. HYRTL, J., Handbuch der topographischen Anatomie und ihrer praktisch medizinisch-chirurgischen Anwendungen, J. B. Wallishausser, Wien, 1847, 1: 314.
26. CLOQUET, J., Manuel d'Anatomie Descriptive, Bechet Jeune, Paris, 1825, 1: 400.
27. VAUGHAN, W., An Exposition of the principles of Anatomy and Physiology, G. G. J. and J. Robinson, London, 1791, p. 375.
28. TESTUT, L., *Traité d'Anatomie Humaine*, Gaston Doin & Cie., Paris, 8 Ed., 1928, 2: 259.

SKIN INFECTION DUE TO ALTERNARIA TENUIS

(WITH THE REPORT OF A CASE)

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CLINICAL DATA

THE patient was a Roumanian Jewess, 36 years of age, the mother of two children, both of whom are alive. Sixteen years ago, while scrubbing her verandah, she ran a splinter into her left hand. It was immediately removed and tincture of iodine applied. On the following day a group of pustules formed on the skin of the dorsum of both fore-arms and hands. The condition on the right limb disappeared spontaneously in a day or two. The condition on the left persisted and has persisted. She also had a pustule on the back of the left heel. This also disappeared entirely. The patient had never been free of the condition in the left fore-arm and hand. During the last few months it had been particularly painful. On the application of water at any temperature considerably more pain was experienced.

The patient when seen on December 3, 1932, had a number of dark, ulcerating macular and papular lesions on the left fore-arm and hand, from which a sero-purulent fluid could be expressed. On the fore-arm the lesions extended quite deeply into the scarf-skin but not into the corium. On the hand, particularly, in the region of the knuckle the papules extended almost to the fascia. The lesions were dark brown or black in the centre and were quite scaly. There were also a considerable number of scars where former lesions had been. Clinically, the lesions had the typical appearance of a fungous infection.

The lesions tended to heal spontaneously, only to reappear in another region of the fore-arm and hand. At one time, approximately seven years ago, she was apparently without any sores for a period of two weeks at the end of which time fresh ulcers re-appeared. She had been treated off and on during the entire period of the condition.

MICROSCOPIC AND CULTURAL DATA

On December 3, 1932, when the patient was first seen, a number of scales were digested with 10 per cent solution of potassium hydroxide. Under 10 x 10 magnifications a long branching

septate mycelium was seen intercellularly. The hyphae did not invade the individual cells. There was no indication of spores or spore-formation. No bacteria or other organisms (yeasts) were found. A number of stained specimens (using Wright's solution, carbolfuchsin, methylene blue) revealed the same type of organism; bacteria and yeast bodies were absent.

A smear of the pus showed a considerable number of lymphocytes, some pieces of mycelium, but no spores. The same slide treated with Wright's solution revealed the same under oil-immersion lens with a 95 x 10 magnification. The pieces of the mycelium contained spherical bodies. No yeast-like or bacterial bodies were found. The mycelium was easily stained, but no particular advantage was obtained by staining. The scales, pus and sero-purulent fluid were negative for acid-fast bacilli.

Culture 1.—The infected area was washed well with soap and hot water and the area disinfected with denatured alcohol. Some pus was taken up in a sterile Pasteur pipette which had previously been autoclaved at 15 pounds pressure and 250°F. The pus was transferred to a flask containing a medium of agar and beef broth whose pH was 4.7. This at no time showed any growth.

Culture 2.—In the same medium in a culture tube a scale was placed. This immediately sank

to the bottom of the tube. This culture at no time showed any signs of organisms.

Culture 3.—A scale was placed in a sterile Petri dish containing 50 drops of beef broth and sterile liquid paraffin. After 4 days colonies of the consistency and transparency of serous membrane formed and floated on top of the medium. Each colony was in the form of concentric circles about the original scale, with darkened borders marking off each circular area. Under 44×10 magnification the colonies appeared to consist of long branching septate hyphæ, containing dark spherical bodies in the cytoplasm of each segment. These bodies showed a tendency to form aggregations close to the septa. The walls of the hyphæ were opaque and relatively thick. After 6 days there was no increase in the size of the colonies, and at no time did spores appear, or any suggestion of asci.

Culture 4.—A scale was placed on a slant of Sabouraud's medium.¹ Before being used this

several places and the submerged surface was pigmented. The pigmentation was black towards the centre and brown at the periphery. Microscopically, the structure had remained unchanged. A distinction was, however, noticeable between the aerial and submerged hyphæ. The submerged hyphæ contained many more septa, the segments being shorter and wider. The submerged hyphæ contained the spherical bodies and were pigmented, while the aerial hyphæ did not. (Fig. 1). After 10 days the aerial hyphæ became progressively darker.

This culture was examined daily and frequent sub-cultures were taken from it, as will be described below. Macroscopically and microscopically, it showed no important changes until the 15th day. Nor was there any sign of spore or ascus formation during this period. From the 15th day onward the pigmentation became more intense and was a deep black. The spherical bodies in the submerged hyphæ showed

a far greater tendency to aggregate at the septa. On the 21st day spores (asexual-conidia) were found. During the entire period of the 21 days the mould was comparable with Culture 2. Structurally these were identical. (See Figs. 2 and 3).

Culture 5.—A scale was placed on potato medium. The history of this culture is almost identical with that of 4. The rate of growth, however, was somewhat slower. The structural characteristics of the mycelium were identical with 3 and 4. The conidia appeared on the 22nd day.

Culture 1S.—By means of a Pasteur pipette a colony from culture 3 was transferred to the surface of a slant of Sabouraud's medium. After 24 hours a mouldy growth of 1 sq. centimetre was visible. In 48 hours a mould covered 5 sq. centimetres. In 5 days the growth covered the entire surface of the slant and was humped in several places. The dark pigmentation mentioned above began to appear at this time. The aerial hyphæ were white. The morphology of this sub-culture was identical with 5 and 4. Spores appeared on the 21st day from the taking of the scales, and 13 days after sub-culturing.

Culture 1P.—A colony from culture 3 was transferred to a potato medium slant. In 24 hours there was a growth of 0.2 sq. centimetre.

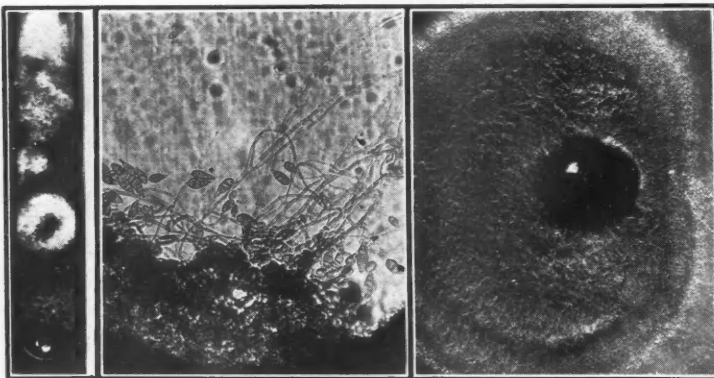


FIG. 1

FIG. 2

FIG. 3

FIG. 1.—A 4-day culture on Sabouraud's medium, showing concentric humping effect.

FIG. 2.— 95×10 magnification showing conidia and hyphæ.

FIG. 3.—A 4-day Petri dish culture on Sabouraud's medium.

medium was placed in an Arnold oven at 250°F . for one hour on three successive days.

In 3 days a white mouldy growth appeared, covering about 1 sq. centimetre. In 5 days the mould had spread over 17 sq. cm. In 6 days the mould covered the entire surface of the slant and was quite humped at the centre. The surface in contact with the medium showed signs of brown-black pigmentation.

Under the microscope, at all powers from 10×10 up, the mould appeared to consist of long branching septate hyphæ. Each segment contained the spherical bodies alluded to before. There were no signs of spore or ascus formation.

On the 8th day the mould was humped in

In 48 hours the mould covered 1.8 sq. centimetres. In 5 days the mould had covered about three-quarters of the surface of the slant. It was humped and pigmented as described above. The aerial and submerged hyphæ were identical with those described in 1S, 5, 4, and 3.

Culture 2S.—To decide if anærobic growth could occur, a colony was sucked up fairly high in a Pasteur pipette (from culture 3). The tip of the pipette was sterilized by passing through a flame three or four times. The tip of the pipette was thrust into a tube of Sabouraud's medium—the thrust being 2 inches deep. After 54 days no growth was visible.

Cultures S. G. A.—Four tubes of serum-glucose-agar, pH 5.2, were inoculated with cultures from culture 4. This medium is a somewhat viscous liquid. While the cultures were placed close to the bottom of the tube, in 24 hours, in all tubes, a healthy growth was observed at the surface of the liquid with a few submerged hyphæ. In 3 days the mould formed a thick, tough white duvet at the surface. At the 5th day the surface of the mould in contact with the medium was somewhat pigmented and produced spores after 8 days of growth. All cultures were examined at the end of a 10-day period and no contaminants were found.

Fourteen days after the original scales were taken and from which the cultures described above were obtained, fresh scales and pus were obtained from the patient. The results were confirmed.

THE REPRODUCTIVE BODIES

The spores (asexual-conidia), as described above, appeared only after 20 days' growth on Sabouraud's and other media. (Fig. 2). Subcultures after this period had elapsed produced the conidia in 5 days on Sabouraud's and from 6 to 7 on potato medium. On slides on which the mould was fixed with water or lacto-phenol solution and ordinary bacteriological fixing methods, the conidia appeared to be interspersed among the submerged hyphæ. When fixed with glacial acetic acid, however, the spores were observed as growing from the aerial hyphæ in chains with a short peduncle separating each conidium from its fellows. These conidia are similar in shape to the "fuseaux" of Sabouraud and other French authors. Due to their large size they are designated as macroconidia, and structurally they are somewhat like the macro-

conidia of *Trichophyton* and *Microsporon*. They are large bullet-shaped bodies, and are of two distinct types; one type is only transversely septate and contains 4 to 8 cells; the other is spindle-shaped and contains 2 to 8 cells. The latter has both transverse and longitudinal septa. They vary in size from that of a single erythrocyte to that of 8 or 10. Both show an easily discernible "scar" at the tip. Four days after the first appearance of the conidia or "fuseaux" a considerable number had sprouted and produced one, two or three hyphæ.

SUMMARY OF CHARACTERISTICS AND CLASSIFICATION

The best medium is Sabouraud's. The optimum temperature for growth is 25°C. The mould is aerobic or aquatic-aerobic. It has a septate mycelium with considerable branching. The submerged hyphæ are the vegetative hyphæ—the aerial, the reproductive hyphæ or conidiophores. The conidia are formed in chains. They are multicellular and are olive green in colour. Each conidium is borne on a short peduncle.

In classifying this organism, the classification suggested by Castellani² was used. This is based on the morphological characters of the hyphæ and spores. J. A. Elliott's³ work was used to decide the species. As the conidia are borne in chains and are multicellular with dark olive-green pigmentation, the fungus was definitely assigned to the genus *Alternaria*. Equivalent genera are *Acremonium* Link; *Seedosporium* Saccardo; *Acremonium Alternatum* Link, all of which equivalent genera are parasitic to man. The species was determined by the structural features of the spores. The species assigned was *Alternaria tenuis*.

A review of the literature suggests the possibility of organisms of this genera being pathogenic; due weight however must be given to the factors of individual and local susceptibility. The factor of local susceptibility is a characteristic of fungous infections. The fact that cultures obtained from the patient did not develop conidia for 21 days suggests the possibility of a form existing which is parasitic in a particular phase of its life history. The possibility of the organism being a facultative parasite is also suggested. Ordinarily the conidia developed in 5 days in all subcultures.

Hopkins, Benham and Kesten⁴ reported a case of asthma which they believed due to *Alternaria*.

the organisms being the exciting protein. They also suggest that an eczema which the same patient had was due to this organism as the patient proved to be sensitive to it. Castellani⁵ has found *Alternaria* in the vaginal discharge of women. According to Henrici,⁶ species of *Alternaria* have been found in the pus of superficial wounds.

The author wishes to thank Drs. J. and C. Markowitz who kindly placed their laboratory, the patient and the clinical facilities at his disposal. Thanks are due to

Prof. H. S. Jackson, of the University of Toronto, for confirming the identification. Particularly the thanks of the author are due to Prof. W. H. T. Baillie, under whose direction this work was done, for his valuable assistance and guidance.

REFERENCES

1. Sabouraud's Medium, Text Book of Bacteriology, Zinsser, D. Appleton, N.Y., 1927, 6th ed., p. 852.
2. CASTELLANI, A., Fungus and Fungous Diseases, American Medical Association, Chicago, 1928, p. 8.
3. ELLIOTT, J. A., *Am. J. Botany*, 1917, 4: 439.
4. HOPKINS, BENHAM AND KESTEN, *J. Am. M. Ass.*, 1930, 94: 6; *ibid.*, *Proc. Soc. of Exper. Biol. & Med.*, 1930, 27: 342.
5. CASTELLANI, A., Fungus and Fungous Diseases, American Medical Association, Chicago, 1928, p. 138.
6. HENRICI, A. T., Moulds, Yeasts and Actinomycetes, Wiley, N.Y., 1930, p. 120.

ACTIVE PULMONARY TUBERCULOSIS AND DIABETES MELLITUS*

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THERE is a general impression that "galloping consumption" may seize the diabetic at any time. With an estimated diabetic population of over one million in the United States and Canada, and an estimated number of at least 20,000 of these suffering from pulmonary tuberculosis, there is sufficient reason to warrant careful study of this complication of diabetes. Such an investigation is one of the important functions of large clinics, and the purpose of this communication is to review briefly the relevant literature and comment upon the experiences in the Clinic for Diabetes in the Montreal General Hospital.

It has long been the teaching that the triumvirate of the "Captains of the Men of Death," so far as diabetics are concerned, are coma, vascular disease, and infection. The dangers of diabetic coma have been greatly lessened since the advent of insulin. Preventive measures, combined with diet and insulin, have done much to reduce the immediate mortality of at least one of the complications of vascular disease, namely, gangrene; but infection is still the "bête noir" of the diabetic. Aside from mild infections, there are the acute self-limited diseases, such as pneumonia. However, as a rule, these are readily recognizable and are therefore,

less of a menace than such an insidious infection as tuberculosis.

INCIDENCE

There has been a remarkable change in the incidence of tuberculosis amongst diabetics. Two early English physicians, Copland and Bardsley,¹ made the observation that tuberculosis occurred so often in diabetics as to be a sign of the disease. Dorendorf² quoted the following figures given by earlier writers:—Greisinger recorded an incidence of 42 per cent in 250 diabetics, with an equally high mortality, namely, 39 per cent; French and Williamson each reported a 50 per cent incidence of tuberculosis; and Magnus-Levy found that 29 per cent of his diabetics had the disease. Montgomery³ found 9 cases only of active tuberculosis in 111 diabetics. During the past decade, however, the incidence appears to have greatly decreased. From the Mayo Clinic, Adams⁴ reports 10 cases only in the first thousand diabetics on their admission to their clinic, and 14 only of the same group developed active pulmonary tuberculosis after admission to the clinic, a combined incidence of 2.4 per cent. Fitz⁵ found that 35 of 1,529 diabetics at the Peter Bent Brigham Hospital had, or subsequently developed, active pulmonary tuberculosis—an incidence of 2.3 per cent. Joslin⁶ reported 43 amongst his last 3,000 cases—an incidence of 1.4 per cent only.

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POST-MORTEM DATA

Fitz and Murphy⁷ found 7 cases of active pulmonary tuberculosis in 42 autopsies on diabetics at the Peter Bent Brigham Hospital—an incidence of approximately 16 per cent; whereas, in 1,000 routine autopsies on the general hospital population, active lesions were found in 6 per cent of the cases. Amongst 50 similar necropsies, West⁸ found 21 active lesions, 17 of which were acute and regarded as the cause of death. The remaining 4 were chronic.

X-RAY DATA

Sosman and Steidel,⁹ in a study of 182 consecutive roentgen-ray examinations of the chest of diabetics, found active pulmonary lesions in 9 per cent. Of 45 selected persons having tuberculosis and diabetes, 16 had healed apical lesions; 8 had the usual adult apical lesions, and 21 the hilus "unsensitized broncho-pneumonic" type of tuberculosis. It is of interest to note that of the 16 cases of healed apical tuberculosis, one only became active during the diabetes. It would therefore appear that the tuberculosis of diabetics is, as a rule, a fresh process; that it is seldom grafted upon an old quiescent lesion.

ETIOLOGY

Environment.—It has been suggested repeatedly that ignorance, poverty, and their resultant lack of hygiene, are important etiological factors. A lower incidence was noted in diabetics privately treated by von Noorden,¹⁰ compared with his public patients; in the former the incidence was 5.5 per cent; in the latter it was 15.1 per cent.

Age.—When tuberculosis and diabetes were discovered together in the Mayo Clinic group, the average age was 47 years. This agrees closely with the 21 cases of the broncho-pneumonic type of tuberculosis observed at the Peter Bent Brigham Hospital, in which the average age was 51 years. Fitz⁵ suggests that tuberculosis is more common in the older diabetic, because there are more diabetics of this age-period; that it is relatively rare in the young diabetic, because diabetes itself is uncommon in children. Nevertheless, though tuberculosis is undoubtedly more frequent in the latter half of life amongst diabetics, the important clinical fact is that it may occur at all ages.

The impression is general that diabetes is the primary disorder; that the development of diabetes in the tuberculous patient is comparatively

rare. Amongst 31,834 patients in sanatoria for tuberculosis in the United States, glycosuria was found in 101 cases only—an incidence of about one-third of 1 per cent.³ Signs and symptoms of active diabetes were found in 51 cases only—an incidence of one-sixth of 1 per cent. The statistics of the Henry Phipps Hospital show one diabetic in 479 patients with tuberculosis, and those of the Jefferson Hospital show one such in 110 cases.

PATHOLOGY

There appears to be general agreement amongst pathologists that the site of the lesion in diabetes is not as a rule at the apices, but in some other part of the lungs. The most common lesion appears to be an acute caseous process characterized by rapid extension with cavity-formation and with little or no tendency towards fibrosis. As will presently be seen, experiences in this Clinic, supported by x-ray examinations and clinical data, strengthen this view.

DURATION OF LIFE AFTER THE ONSET OF TUBERCULOSIS

The combination of diabetes and tuberculosis is tragic, in spite of modern facilities for the treatment of diabetes. At the present time, diabetics with no complications are expected to have a practically normal expectation of life. Yet, of the 30 with the combined conditions observed by Fitz, 26, or 86 per cent, died within three years; of the Mayo Clinic group, 7 of 10 patients died within seven years. The ultimate prognosis in this combination of diseases does not appear favourable.

THE UNRELIABILITY OF CLINICAL SIGNS

Failure to detect pulmonary tuberculosis in diabetes is often due to the fact that the symptoms are usually mild, in spite of the extent of the lesion, and, also, because they are easily attributed to the diabetes. A careful physical examination, without x-ray studies, also, fails at times, because of the difficulty of detecting a deep-seated lesion. Roles¹² comments upon the generally long latent period with few or no insignificant symptoms; medical advice is usually sought on account of the disturbance of sugar metabolism. Dorendorf² suggests that this is due to the fact that pulmonary tuberculosis in diabetics appears in a special form—"Frühinfiltrat in the Simon-Redeher sense." This form

of lesion, in its early stages, causes little or no symptoms, whether the infiltration invades the infra-clavicular region, the middle zone, or the base of the lung. The condition, at first, is usually a lesion in the centre of the lung surrounded by healthy tissue. This largely explains the unreliability of auscultation and percussion. Râles, usually an expression of an attempt at repair, are often absent. This further emphasizes the importance attached to routine radiography in clinics for diabetes.

Morlock¹³ calls attention to the acuteness of the onset of tuberculosis in patients who are apparently in very good condition physically, thus differing from the onset of phthisis as usually described in text-books. This is probably largely due to the lowered resistance to infection in general so commonly seen in diabetes, which may also explain the rapid and unfavourable course. In certain cases there may be a latent focus which, in mild diabetes, never becomes active, but is readily made so in severe diabetes. Fishberg¹⁴ believes that an apical tuberculosis may heal with little or no treatment; that it is the subapical type which requires intensive management. Some authors cite the rarity of hæmoptysis, pleurisy, and coma, and the relative rarity of a family history of either diabetes or tuberculosis in these cases.

TREATMENT

There is probably no greater problem in therapeutics than the management of combined tuberculosis and diabetes. Uncontrolled diabetes favours the advancement of the tuberculosis, and the tuberculosis, like infections in general, tends to cause reduction of carbohydrate tolerance—a vicious circle. Treatment in the past has been unsatisfactory, largely because the tuberculosis was given first importance. Landis and Funk¹⁵ have demonstrated (and this is the practice of clinics for diabetes in general) that by treating the diabetes first and ignoring the tuberculosis, other than prescribing rest and fresh air, much better results are obtained. Persistent hyperglycæmia, that is, uncontrolled diabetes, predisposes to infection in general, and thus probably plays a part not only in the development but in the extension of the tuberculous process. A normal blood sugar seems to be a *sine qua non*, in order to prevent the spread of a tuberculosis.

Judging from body-weight data, it would ap-

pear that the favourable effects of insulin are not due to the fattening effect, but chiefly to the control of the carbohydrate metabolism. Insulin has undoubtedly altered the outlook of the diabetic suffering from pulmonary tuberculosis. There appear, however, to be other contributing factors. Thus, Fitz suggests that quiescent tuberculosis which antedates the diabetes is more amenable to treatment than tuberculosis which is a late complication of diabetes in the poorly resistant type of individual. Contrary to views expressed earlier, there appears to be no contraindication to combined insulin and pneumothorax therapy.¹²

SUMMARY OF EXPERIENCES WITH TUBERCULOSIS IN THE CLINIC FOR DIABETES MELLITUS AT THE MONTREAL GENERAL HOSPITAL FROM 1920 TO 1932

Associated conditions and complications of diabetes in the Montreal General Hospital have been carefully recorded in an index and cross-index system since 1920, with the establishment of the Clinic for Diabetes. The total number of admissions to the Clinic during this period, including indoor and outdoor cases, has been approximately 4,000. Of this group of patients, approximately 2,500 may be regarded definitely as active diabetics. The remainder include patients with glycosuria and hyperglycæmia, or mild hyperglycæmia alone without symptoms. In evaluating the following data, the fact should be emphasized that every effort is made to discover tuberculosis and cardio-vascular disease in the examination of our patients. As soon as the diagnosis of diabetes is definitely established, the patient is referred to other clinics for several routine examinations. These include a thorough physical examination—examination of the eyes (fundus) for detection of arteriosclerotic changes in the finer blood vessels and roentgen-ray examination of the feet and chest; the former for detection of arteriosclerosis in the larger vessels (calcification of the arteries) and the latter for pulmonary lesions, with particular reference to tuberculosis. Our records are, therefore, regarded as reasonably reliable.

Incidence.—Of 2,500 persons with active diabetes observed during the last twelve years in this Clinic, pulmonary tuberculosis was found in 41 cases, an incidence of 1.6 per cent. This corresponds exactly to the combined experiences of Joslin,⁶ Fitz and Murphy,⁷ and Adams.⁴ This

low incidence is an agreeable finding, in view of the high mortality from tuberculosis in United States and Canada in general, and especially in the Province of Quebec. Of these 41 cases, 28 were in males and 13 in females. This, one would expect *a priori*, as diabetes appears to be more common in the male.

It is of interest to note that 17 of the 41 patients, an incidence of 41.4 per cent, were Hebrews; while approximately 30 per cent of the total population of the Clinic for diabetes belongs to that race. It is common knowledge that the adult Hebrew is especially liable to diabetes, but in this part of the continent no particular predisposition to tuberculosis has been noted.

The ages at which the tuberculosis was first discovered may be of interest. They were as follows:—

Age period	Number of cases
20 to 30	5
31 to 40	6
41 to 50	14
51 to 60	11
61+	5

The youngest patient was 20, and the oldest was 64 years of age. It will be noted that we have as yet to meet with a juvenile diabetic suffering from tuberculosis. Ordinarily, tuberculosis is considered to be more common between the ages of 20 and 35 years. From this

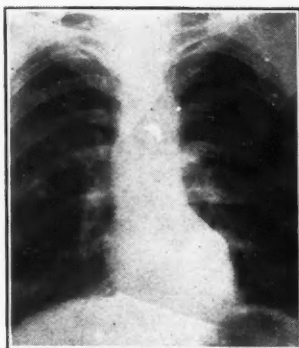


FIG. 1, July, 1931.

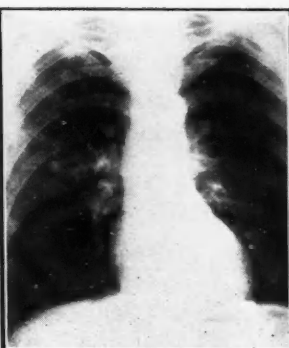


FIG. 2, August, 1932.

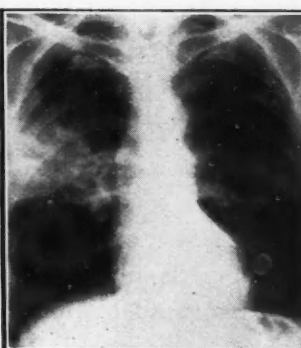


FIG. 3, November, 1932.

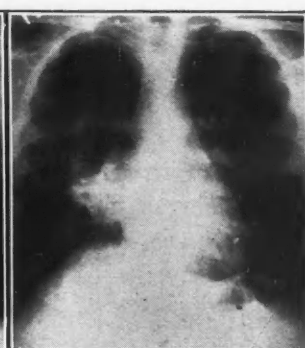


FIG. 4.—Routine x-ray in a known diabetic of four years duration; no symptoms or signs. Two years later active bilateral pulmonary tuberculosis developed.

Serial x-rays showing the development of the hilus reaction and later the parenchymal lesion of active tuberculosis.

According to the height, weight, age, sex standards used in this Clinic,* 17 of the 41 patients were normal, 13 were overweight, while 11 were under-nourished. The *habitus phthisicus* of Hippocrates, very much emphasized by life-assurance companies in evaluating risks, was, therefore, apparently not the most important etiological factor in these cases, as in about 75 per cent of the group the body weights were not only normal, but some of the patients were over-nourished.

A family history of tuberculosis, diabetes, or both, in this group was not a prominent feature; tuberculosis alone was noted in 5 cases; diabetes alone in 4; and both diseases in 3. It may be observed that the histories taken in this Clinic are fairly uniform and, therefore, reasonably reliable. Patients are invariably asked about tuberculosis and diabetes in the family.

series, it would appear that tuberculosis attacks the diabetic in the latter half of life.

As diabetics with pulmonary tuberculosis need special care of the diabetes to obtain the best results, it is of interest to note that seven-eighths of the patients in this series lacked the precise treatment necessary for the proper control of the diabetes prior to their admission to our Clinic. In 13 cases, the diabetes was first discovered when the patients were admitted to the hospital for some other complaint. They therefore received no treatment whatever for the diabetes prior to the discovery of the tuberculosis. In 7 cases, the control of the diabetes was poor. This was due either to resistance to treatment or to gross dietary indiscretions. In 16 cases, the patients received average care. In the remainder (5 cases) the diabetes was well controlled.

Clinical features.—In 27 cases, the diabetes was definitely known to have preceded the tuber-

* Rabinowitch, I. M., *Canad. M. Ass. J.*, 1926, 16: 1021.

culosis; in 10 the two diseases were discovered simultaneously; and in the remaining 4 the histories suggest that the tuberculosis was the forerunner. These histories are, however, difficult to interpret. Because of the short interval between the discovery of the two diseases, at least two of the four cases may be regarded as belonging to the group of simultaneous discovery. In one case, there was re-activation during the course of the diabetes of a quiescent apical lesion which was discovered three years previously. In the other case, the history suggested an inactive pulmonary tuberculosis for 27 years. These data, therefore, support the view generally held that tuberculosis of diabetics is a fresh process; that diabetes precedes the tuberculosis, at least in a great majority of cases. It is possible that diabetes may occur during the course of an active tuberculosis, but it does so, apparently, very rarely.

As previously stated, according to the literature, hæmoptysis, pleurisy and coma appear to be uncommon in the diabetic, but, in our series, hæmoptysis was met with in 12 cases, pleurisy in 3, and in 2 the patients suffered from coma. The most frequent complaint was rapid loss of weight.

In 10 cases there was onset with an acute febrile reaction; in 23 the signs and symptoms developed slowly; in 3 there were symptoms but no signs; and in 5 the tuberculosis was discovered because of our routine periodic x-ray examination of the chest. The importance of this type of examination is, therefore, again, emphasized.

X-ray findings.—The types of tuberculosis revealed by roentgen-ray examination are of interest. There were no x-ray records in 2 cases. In the remaining 39 the apical lesions usually seen in non-diabetic adults were found in 23, and in the remaining 16 the lesions were peculiar, but fairly uniform; the hilus shadows were unusually marked and the parenchyma of the lung had a pneumonic appearance, frequently deep-seated, and about the hilus. This tends to support the view that the lesion of tuberculosis in diabetes is often of the "unsensitized florid" type of childhood, and that it is of recent origin. This view is further supported by the absence of calcification in the root shadows and apical areas. The central situation of the lesions probably explains the failure at times to detect the disease by auscultation, and,

again, emphasizes the importance of x-ray examination.

From serial x-ray studies it would appear that the spread of the tuberculosis is either from the hilus glands to the surrounding parenchyma, or from an early and deep-seated lesion in the parenchyma at the hilus. These serial x-rays also suggest tuberculosis of recent origin rather than the aggravation of a long-standing quiescent lesion. The finding of latent lesions in some cases in our routine x-ray examinations was, however, a disturbing factor. With increased root-shadows due to the enlarged glands it would appear in some cases that there also was a pre-existing hilus adenitis. Whether the hilus adenitis may also be quiescent and activated by the diabetes, or whether it is also, as a rule, a fresh process, is not clear. Our x-ray data suggest the latter.

An analysis of our x-ray films of diabetics with no clinical tuberculosis showed the following:—

<i>Lesion</i>	<i>Incidence per cent</i>
No lesion	72.3
Healed apical lesions	6.6
Calcified glands	16.0
Increased hilus shadows	5.1

It is the last group, namely the patients with increased hilus shadows, who should be subjected frequently to x-ray examination in order to detect development of parenchymal lesions; and when such a lesion is found, it should, in my opinion, be considered as a hilus reaction of tuberculosis until proved otherwise. Periodic x-ray examination should then be a routine; and when signs of involvement of the surrounding lung tissue appear, suitable treatment from the standpoint of tuberculosis should be immediately instituted. In the majority of cases the lesion is unilateral, and is then suitable for artificial pneumothorax. According to our experience, it is not likely that healed apical lesions or calcified glands will become active, providing that the diabetes is properly controlled.

Clinical progress.—During the time these 41 patients were under observation at the Clinic, the diabetes was easily controlled in 23 cases and was difficult to control in the remaining 18, either because of resistance to insulin or from gross dietary indiscretions.

The mean duration of life, *after the discovery*

of the tuberculosis in the 21 fatal cases was 12.9 months. One patient lived 8 years, 16 lived less than 8 months, while the remaining 4 died in 12, 18, 27 and 48 months, respectively. Contrasting the two forms of tuberculosis *without regard to the control of the diabetes*, the average duration of life amongst those who died was 17.3 months in the case of the apical variety, while it was 9.3 months in the hilus-pneumonic type. Of the 7 living patients with the apical form, the average length of life to date is 35.6 months; the maximum period is 7 years and the minimum 1.3 years. Of the four living patients with the hilus-pneumonic type only one has lived for any length of time, namely, six years; in the other 3, the duration of life to date is 10, 7 and 3 months, respectively. Therefore, without regard to the degree of control of the diabetes, the hilus-pneumonic type of tuberculosis undoubtedly appears to be the more fatal lesion. The following data, however, clearly indicate the importance of a knowledge of the degree of control of the diabetes in the interpretation of mortalities from tuberculosis.

Careful "follow-up" records were obtained in 32 cases with respect to the degree of control of the diabetes; and it will be observed that, *regardless of the type of lesion*, there was a definite relationship between mortality and control of glycosuria. Of the 16 persons with apical lesions, 7 are living, and of the 16 with the hilus-pneumonic type of lesion, 4 only are alive. In *all* of the living patients, however, the diabetes was under control. In the case of the 9 who died with apical lesions treatment failed in 4, either because of resistance to insulin or gross dietary indiscretions, and, of the 12 who died with the hilus type of lesion, the diabetes was not controlled in 9 cases. These data may be summarized, briefly, thus:—

Subjects	Number	Control of diabetes	
		Good	Poor
Living	11	11	0
Dead	21	8	13

Regardless, therefore, of the type of lesion in the lungs in all of the living patients, the diabetes was well controlled; whereas, of the 21 who died, 13 had hyperglycæmia and glycosuria.

Though the above statistics indicate the seriousness of a combination of tuberculosis and diabetes, and the relatively greater danger of the hilus-pneumonic compared with the apical

lesion, they also indicate the importance of the control of the diabetes, regardless of the type; they stress the fact that every effort should be made to bring the carbohydrate metabolism of the individual under control. Our experiences in this Clinic indicate that there is no danger in the practice of over-feeding, providing the increased amount of food is properly counter-balanced by insulin. When hyperglycæmia and glycosuria cannot be controlled under these conditions, the outlook for the patient is better with a lesser caloric intake, but with a normal blood sugar.

Autopsy data.—During the ten-year period ending in 1932 57 autopsies were performed upon diabetics in the Montreal General Hospital. Healed apical tuberculosis was found in 10 cases and active tuberculosis in 4. The adult apical lesion was found in 1 of the active cases, while in the remaining 3 the hilus-pneumonic type was found. In each of the four cases, the process was acute and there was no evidence of any remote lesion. Patchy consolidation, with caseation and cavitation, and without signs of fibrosis or calcification, were the essential pathological lesions. In one instance the lesions centred in the hilus glands. These were found to be large and caseous and on cross-section somewhat resembled the hilus glands seen in miliary tuberculosis of childhood. The above findings, therefore, also support the view that the tuberculosis of diabetics is an acute and fresh development and not an aggravation of a pre-existing condition.

SUMMARY AND CONCLUSIONS

The results of a study of tuberculosis in the Clinic for Diabetes at the Montreal General Hospital are reported.

Forty-one cases only of active pulmonary tuberculosis were found amongst 2,500 patients who had active diabetes—an incidence of 1.6 per cent.

The youngest patient amongst the 41 was 20 years of age, and the average age for the group was 44.8 years. None of our juvenile diabetics have as yet had tuberculosis.

Tuberculosis in diabetes may be acute, chronic, or of a latent type detectable only by x-rays, and the lesion may be either of the non-diabetic adult apical type or the hilus-pneumonic variety. In either case it is usually a fresh process, and the hilus-pneumonic type of lesion may be so

situated that the ordinary clinical methods of examination may fail to detect it. This emphasizes the importance of periodic x-ray examination as a routine in the management of the diabetic.

The finding of increased root shadows in the diabetic should always be regarded as tuberculosis until proved otherwise.

In this group of cases, the apical type of lesion was less fatal than the hilus-pneumonic type; but, regardless of the lesion, mortality was definitely related to the degree of control of the diabetes. Uncontrolled diabetes is an unfavourable prognostic sign. A sugar-free urine and normal blood sugar should, therefore, be the aim in treatment.

Treatment of diabetes with tuberculosis is identical with that of the treatment of diabetes without tuberculosis, so far as diet and insulin are concerned. Over-feeding may be attempted, but should be continued only when the excess food can be so counterbalanced by insulin that

the urine is free of sugar and the blood sugar is normal. Otherwise, it is best to keep the caloric value of the diet at a normal level.

The writer gratefully acknowledges the cooperation of Dr. I. M. Rabinowitch, Director of the Department of Metabolism and Chief of the Clinic for Diabetes, and of Dr. W. L. Ritchie, Director of the Department of Roentgenology during the investigation upon which this paper is based.

REFERENCES

1. COPLAND AND BARDSLEY, quoted from Péronne, *La tuberculose pulmonaire du diabétique*, Thèse de Paris, 1924, p. 141.
2. DORENDORF, H., *Med. Klin.*, 1928, **24**: 485.
3. MONTGOMERY, C. M., *Am. J. M. Sc.*, 1912, **164**: 543.
4. ADAMS, S. F., Staff Meetings of the Mayo Clinic, 1929, **4**: 192.
5. FITZ, R., *Am. J. M. Sc.*, 1930, **180**: 192.
6. JOSLIN, E. P., *The Treatment of Diabetes Mellitus*, 4th ed., Lea & Febiger, Phila., 1928, p. 998.
7. FITZ, R. AND MURPHY, W. P., *Am. J. M. Sc.*, 1924, **176**: 313.
8. WEST, *Diseases of the Organs of Respiration*, Griffin, London, 1902, vol. 2, p. 523.
9. SOSMAN, M. C. AND STEIDEL, J. A., *Am. J. Roentgenol. & Radium Therap.*, 1927, **17**: 625.
10. NOORDEN, V., *Die Zuckerkrankheit*, Springer, Berlin, 1927.
11. Quoted from Ritter, *Illinois M. J.*, 1931, **60**: 371.
12. ROLES, J. C., *St. Barth. Hosp. J.*, 1929, **36**: 186.
13. MORLOCK, H. V., *Tubercle*, 1929, **11**: 267; *idem.*, *The Lancet* 1929, **2**: 60.
14. FISHBERG, M., *Am. Rev. of Tuberc.*, 1928, **17**: 3; and *Brit. M. J.*, 1929, **2**: 331.
15. LANDIS, H. R. M. AND FUNK, E. H., *Tr. Nat. Tuberc. Ass.*, 1922, **18**: 335.

DISSIMILAR METALS IN THE MOUTH AS A POSSIBLE CAUSE OF OTHERWISE UNEXPLAINABLE SYMPTOMS

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RECENT investigations have demonstrated the fact that metals in the mouth may set up electro-galvanic discharges. These discharges take place between dissimilar metals, and, according to Solomon, Reinhard and Goodale,⁵ on some few occasions between alloys of the same type.

THEORY

It is generally well known that electrical energy is produced when dissimilar metals are immersed in an electrolyte. The metals are found to be arranged in the electromotive force series from positive (highest potential) to negative as follows:— (positive end) aluminum, zinc, chromium, iron, nickel, tin, copper, mercury, silver, palladium, platinum, gold (negative end). Electrogalvanic activity parallels chemical activity. It can thus be assumed that the baser the metal or the more unstable the alloy that is being associated with the noble metal or stable alloy, the more active will be the

discharge of electrical energy. Human saliva, whether acid, alkaline or neutral, makes a good electrolyte through which metallic electrons freely circulate from a metal of higher to one of lower electropotential. By means of experiments carried out in a chemically pure gold vessel filled with saliva and into which various metals could be immersed to form a galvanic cell, we corroborated the above-mentioned fact, which was first noted by Lain.³ To test the possibilities of the ordinary substances used as restorations in the oral cavity one has but to introduce them into a commercial electrolyte, such as a 10 per cent solution of sulphuric acid, and then to measure the current generated. When aluminum and pure gold are combined under such circumstances a current of 1500 microampères is generated. The same metals combined with saliva as the electrolyte produce a constant current of 65 microampères. A 0.4 per cent solution of hydrochloric acid, which is extremely active on aluminum, generates 6000 microampères when used as the electrolyte.

METHOD

The minute intensity of the currents produced calls for the use of a microammeter for their accurate registration. A suitable instrument should have a range of from zero to 200 microampères and an internal resistance of from 8 to 30 ohms. Such instruments are scarce and very expensive, being made for extensive research purposes only. A milliammeter such as that devised by the Weston Corporation, with a range from zero to one millampère, and graduated into fifty divisions, so that each represents 20 microampères, will prove satisfactory in clinical use. It is inexpensive and easily obtainable. To connect the instrument into circuit, leads of No. 18 copper wire, heavily insulated, are used. The insulation material is scraped away for one-quarter of an inch, and, except for the contacts, the ends of both wires are coated with paraffin which can be sterilized in alcohol.

Fig. 1A, on the left, shows a Cambridge microammeter with a range of from zero to 120 microampères and an internal resistance of 10 ohms. The connectors B on the right of the instrument are for use with a thermocouple, and are not required in this work. The positive pole (+) of the ammeter is connected by means of the rubber covered wire C to the nobler metal under study, which in this illustration is the

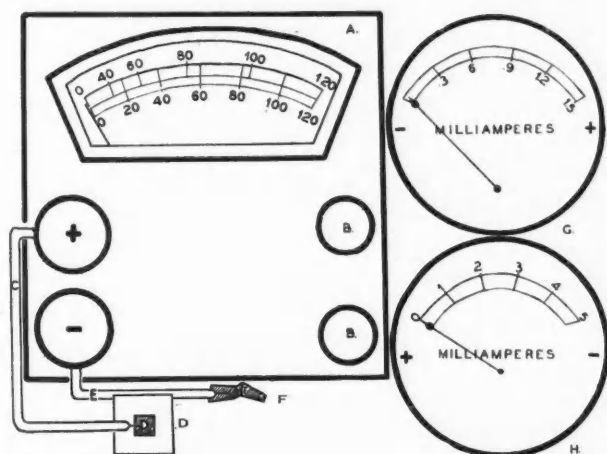


FIG. 1—Microammeter and milliammeters used to measure the amount of current generated by dissimilar metals in the mouth. For mode of employment see text.

gold vessel D, forming the lining of the cell. The negative (-) pole E, is connected with the baser metal F, and when immersed in the electrolyte contained in the vessel discharges an electrogalvanic current through the closed circuit, the intensity of which registers on the microammeter. As strong currents will ruin

these instruments, the two milliammeters G and H on the right are used for the preliminary tests of new materials. The milliammeter on the upper right will prove satisfactory for clinical use, as the first division measures 20 microampères, an intensity quite commonly found in contacting the various metallic substances encountered in the oral cavity. The connecting wires (E and C) should be about six feet in length. When testing the restorations in a patient's mouth the wire C is placed in contact with the substance assumed to have the highest precious metal (gold, platinum) content. The other wire E is contacted with the baser substance (dental amalgam, vulcanites, cements, silicate fillings and light-coloured gold alloys) under examination. Should the needle swing to the left of the scale, that is, beyond zero (to the negative side) the position of the contacts should be reversed, for the wire C may not be in contact with the metal of lower electropotential.

Observations have been made upon 80 patients. Forty-six were males, 34 were females. The youngest was 5 years of age, the oldest 51. Seven of the 80 patients, or almost 9 per cent, had complaints or findings directly attributable to dissimilar metals in their mouths.

One patient complained of a metallic taste and nausea. There was staining of the precious metal present. The condition was due to a removable appliance. Another patient complained of a throbbing tooth, salty taste, and violent shock when her tongue touched a gold crown. The symptoms were due to the wedging of a small particle of dental alloy amalgam against the gold crown. This patient was completely relieved upon the removal of the wedge of amalgam. A third patient complained of a constant toothache. She was found to have a superficial cavity filled with dental amalgam lying on the buccal surface. There was no contact of dissimilar metals. She was cured when the dental amalgam was replaced by cement. A fourth patient with a large distal amalgam filling in the lower right bicuspid in contact with a precious metal band on the adjacent molar showed marked loss of amalgam mass and staining of the restorations in the mouth. A new amalgam filling was inserted on two occasions, and on both occasions a rapid disintegration of the filling ensued. A third replacement was postponed until three months ago, when the precious metal band was removed. Amalgam

fillings were then placed in the lower right bicuspid and in the adjacent molar. There have been no local changes noted to date. The fifth patient showed a leukoplakia-like lesion on the mucous membrane in the region of an aluminum bronze part on a previous metal band. The current generated in this case measured 40 microampères. The lesion cleared up after the removal of the aluminum-bronze part from the band.

Seventy-six of the 80 patients gave evidence of currents in their mouths, which ranged from 1 to 65 microampères. All except 7, however, were without subjective or objective findings.

Two patients with symptoms showed neither true oral lesions nor objective changes in the metallic dentures present. We shall concern ourselves in this preliminary report chiefly with their cases, for they appear to constitute a new problem. In both the more commonly thought of possibilities were all considered and excluded.

CASE 1

In the first case Mrs. L. K., aged 51 years, long a sufferer from chronic arthritis, early in 1932 had a bridge inserted to replace the four lower incisors. She wore a full upper denture of vulcanite, and on the lower left side a fixed bridge from the first bicuspid to the second molar. Shortly after the anterior bridge had been placed she began to complain of a constant unpleasant metallic taste in her mouth. When drinking coffee this unpleasant taste would become so bad as to make her nauseated. The electro-galvanic phenomenon being unappreciated at that time she was forced to suffer. She was sent for in the spring of this year. Tests with a microammeter disclosed a constant current of 15 microampères when contact was made between the two bridges. It was now observed that the posterior bridge was of the customary yellow colour, signifying a content of copper and zinc in the gold alloy. The recently placed anterior bridge was white in colour, and probably contained a considerable quantity of nickel, silver, and in addition zinc with a rather small gold content (Fig. 2A). To break the contact between the two bridges of dissimilar constitution, a space was ground between the crown on the bicuspid and the inlay on the canine. The following day the patient reported complete disappearance of the metallic taste. There has been no recurrence to date. A test in the experimental cell, using coffee as an electrolyte and aluminum as the positive metal, gave a constant reading of 120 microampères. When saliva was added the readings rose to 300 microampères.

It is worthy of note that other patients have also complained that the metallic taste was aggravated by coffee.

CASE 2

In the second case A. G., a waiter, aged 36, when first observed complained of pain in the left groin, loss of weight, diarrhoea, dyspnoea, borborygmi and a metallic taste in his mouth. His past history made mention of a specific urethritis, a bilateral herniotomy

and an appendectomy. He took alcohol and tobacco in moderation. The general physical examination, including a fluoroscopic examination of the chest and a roentgen-ray examination of the gastrointestinal tract following the administration of barium, was essentially negative. His urine was normal, the blood Wassermann test negative. The blood picture was that of a moderate secondary anaemia. Attention was focused upon the condition of the patient's mouth, for it was felt that the recurrent hernia did not require immediate attention. In the upper arch he had a large amalgam filling on the distal surface of the upper left third molar and a gold crown on the right first bicuspid, carrying a dummy to replace the second bicuspid. On the left side there was a gold crown on the first molar with a similar dummy for the left second bicuspid. In the lower arch he had a gold bridge from the second bicuspid to the second molar on each side, and a gold crown on the lower right third molar. This crown in occlusion made

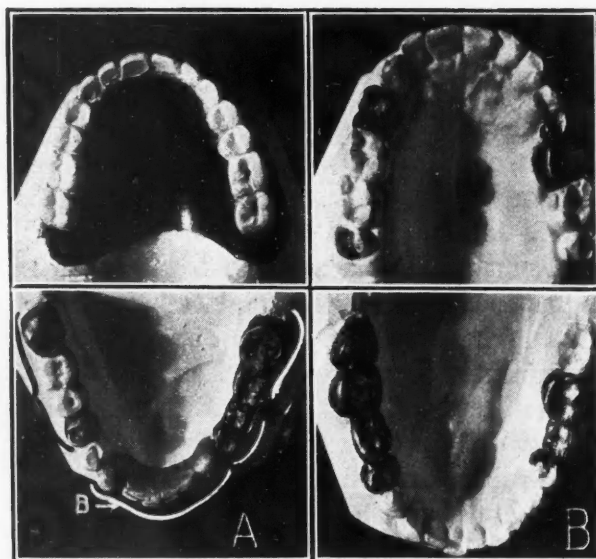


FIG. 2.—A is a reproduction of the teeth and restorations in the mouth of the patient referred to in Case 1. When a circuit was completed between the anterior bridge B and either of the two posterior bridges currents of 15 microampères were generated. Close scrutiny will show the separation E ground between the left bicuspid and the canine which broke the circuit liberating the current.

The casts on the right are a reproduction of the patient's teeth in the second case. On this occasion the symptoms were attributable to the contact between the dental amalgam filling on the upper right third molar and the gold crown on the lower right third molar when occluded. The amalgam filling was ground down until no further contact was made.

contact with the amalgam filling on the upper right third molar. A dental radiographic examination showed all the teeth to be vital and free from any disease. Microammeter readings of all possible contacts showed a constant current of 15 microampères between the crown and the amalgam filling, and of 1 to 2 microampères between the points of the gold bridges when the silver alloy amalgam filling was excluded (Fig. 2B). The silver filling was ground out of contact. This simple treatment resulted in the immediate disappearance of the metallic taste as well as of the other symptoms. This patient has remained symptom-free for over four months. He is being observed from time to time and will be subjected to another roentgen-ray examination of his gastrointestinal tract shortly.

DISCUSSION

Lain,³ Lippman,⁴ Ullman and others have drawn attention to the fact that dissimilar metals in the oral cavity may be responsible for local objective changes such as acute and chronic inflammation, blanched or grayish patches, erosions, ulcers, areas of leukoplakia and pigmentation. Lain has numbered among the objective changes in the metallic dentures, discoloration, areas of erosion, disintegration, loosening of restorations, and maladjustment of dentures. According to him, the complaints which can be due to dissimilar metals in the mouth may include a metallic or salty taste, increased salivary secretion, burning tongue, dryness or tickling sensation in the throat, nerve shocks, nervous irritability and loss of weight. To these we can add dyspnoea and diarrhoea. In both patients referred to above the original symptoms could be reproduced by restoring the original local conditions.

Sufficient evidence has now accumulated to indicate definitely that dissimilar metals in the oral cavity can be responsible for local lesions, and local and general symptoms. It has been and can be shown that electro-galvanic discharges may be present in the oral cavity and the patient remain symptom-free. Perhaps some of the local changes, and, for that matter, general symptoms, can be explained upon a purely chemical basis. Certainly, as Solomon, Reinhard and Goodale⁵ have shown, there is frequently no direct connection between the amount of current measured and the symptoms present. Recognizing the possibilities suggested by our two cases, it should also be appreciated that dissimilar metals in the mouth which are producing electrogalvanic discharges may be responsible

for symptoms, even in the absence of a local lesion or changes in the metallic denture present. Perhaps the nature of the patient's diet may be of some moment in such cases. We have tested many substances in solutions. To refer only to a few; when gold and aluminum are combined with milk as the electrolyte a current of 65 microampères is registered; if an equal quantity of saliva is added to the same combination 105 microampères is generated. A weak salt solution under similar conditions registers 400, strong tea 110, zinc chloride mouth wash 300 microampères.

The treatment is simple. The offending metals present should be replaced. Occasionally, destroying the contact between the dissimilar metals suffices. Before symptoms are attributed to dissimilar metals in the mouth all other important conditions must first be excluded. A milliammeter is inexpensive and easy to handle. Its use in office practice is recommended. It should certainly form part of the equipment of not only dental but also of large medical clinics. Prophylaxis is of course the chief consideration. When dental work is recommended and restorations become necessary the use of inert metals, preferably noble metals, should always be urged.

BIBLIOGRAPHY

1. HOLLANDER, L., Galvanic Burns of the Oral Mucosa, *J. Am. M. Ass.*, 1932, **99**: 383.
2. HYAMS, B. L., The Electrogalvanic Compatibility of Orthodontic Materials, *Internat. J. of Orthodontia & Dentistry for Child.*, 1933, **19**: 9.
3. LAIN, E. S., Chemical and Electrolytic Lesions of the Mouth Caused by Artificial Dentures, *Arch. Dermat. & Syph.*, 1932, **25**: 21. *Ibid.*, Electrogalvanic Lesions of the Oral Cavity Produced by Metallic Dentures, *J. Am. M. Ass.*, 1933, **100**: 717.
4. LIPPMANN, A., Disorders Caused by Electric Discharges in the Mouth with Artificial Dentures, *Deutsche med. Wchnschr.*, 1930, **56**: 1394.
5. SOLOMON, H. A., REINHARD, M. C. AND GOODALE, H. I., Precancerous Oral Lesions from Electrical Causes, *The Dental Digest*, 1933, **39**: 142.

Sir Leonard Hill, the eminent English physiologist and writer on public health subjects, finds that certain heat rays (infra-red rays) given off by dark or dull-red sources of heat cause the nostrils to contract and thus interfere with breathing. He believes that this is the chief reason for the stuffiness that we experience in an overheated room. In a lecture given at the recent Public Health Congress in London, he showed that this effect is not due to a direct action of the heat upon the nostrils, but that it is a reflex effect from the sensory nerves of the skin. He describes the particular heat rays that give this effect as "nose-shutters." Their action is especially marked in persons whose breathing is already partially obstructed,—those with a deflected septum of the nose, for example, or persons suffering from catarrh, asthma, or hay fever.

The effect can be neutralized by fanning the skin of the face with an electric fan, or by the action of

certain other rays, which he speaks of as "nose-openers," that are given off especially by luminous sources of heat. They may also be absorbed by water vapour, and he suggests that this is the explanation of the efficacy of a bowl of water placed in front of a heater in relieving the stuffiness of a room.

He finds also that these nose-shutting rays cause a diminution in the secretion of the mucous membrane of the nose, and since these secretions may be supposed to protect us from infecting organisms in the air, it is possible that the nose-shutters increase the risks of respiratory infections.

From experiments made at Bedford College, London, he found that 60 per cent of the persons examined experience difficulty in breathing when exposed to heaters that give off these nose-shutting rays, and that in over 25 per cent of the cases the obstruction to breathing was so marked that it could be demonstrated in records of the respiration made upon a suitable apparatus.—*The Diplomat*, 1933, **5**: 190.

OBSERVATIONS ON THE RESULTS OF THE OPERATIVE TREATMENT
OF TRIGEMINAL NEURALGIA

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THIS study of the post-operative results and complications in 119 patients was undertaken to enable us to draw some conclusions regarding the best surgical procedure to employ in the treatment of trigeminal neuralgia. Seven years ago it was generally agreed that the correct operative treatment of this affection consisted in the complete section of the sensory root of the nerve. The operation had reached a high degree of refinement, so that it was both safe and simple and gave highly satisfactory results in the relief of the paroxysms of pain. The complete anaesthesia of the face and the occasional loss of the sight of one eye which resulted from it was considered of relatively little importance when compared with the relief of pain.

To overcome the disadvantages of complete section of the sensory root, Frazier¹ in 1925, reported his operation of partial or differential section of the root in selected cases of second and third division neuralgia. Then again in 1929, Dandy² advocated approach to the nerve in the cerebellar fossa in preference to the temporal route, and startled the neurological world by suggesting that all of the fibres pertaining to the painful spasm of tic douloureux were gathered in the lateral part of the root close to the brain-stem so that a small section into the root at this point cured trigeminal neuralgia and caused little or no loss of sensation in the face or cornea.

MORTALITY

The cerebellar approach was used in only five of the 119 patients. One of these gave considerable concern because of bleeding in an inaccessible situation high in the angle; in all of the other patients the temporal route was used. There have been three fatalities.* This is not a high mortality, as 50 patients were over 60 and several over 80 years of age. With the exception of these three deaths there has been

very little cause for post-operative concern. One fatality was very unfortunate, as the patient died from meningitis. A second patient, a man 79, died one week after operation from pneumonia; a post-mortem examination showed the absence of post-operative clot. The third patient, a woman 65 years of age, died on the third day after operation without recovering consciousness. A post-mortem examination was not made, but the wound was re-opened and appeared normal. It was assumed that she had developed an intra-cerebral thrombosis.

QUESTIONNAIRE

1. Has the pain been completely relieved? If not is the pain similar to that which you had before operation?
2. Has your eyesight been affected or have you had any serious inflammation of the eye?
3. Does the numbness of the face bother you?
4. Knowing that the type of pain which you had before operation would have persisted and probably increased in severity, do you feel that the operation was worth while?
5. Further comments:
Please sign.

Information was obtained from 56 patients who had complete section of the sensory root and from 22 who had partial section of the sensory root in answer to the above questionnaire. An analysis of the results obtained from these patients follows.

COMPLETE SECTION OF THE SENSORY ROOT BY
THE TEMPORAL APPROACH

1. *Results in general.*—Fifty-six patients answered the questionnaire; 33, or 59 per cent, had no complaint and were free from disability. The most frequent and serious complication was due to inflammation of the eye. Thirteen complained of varying degrees of burning, itching and crawling sensations in the anaesthetic area. The numbness bothered very few. In the majority of patients these sensations may be classified as minor complaints. However, they must be taken into consideration in this operative procedure and they undoubtedly play a much smaller part when a partial section has been performed, thus leaving a smaller anaesthetic area.

* On October 24, 1932, there were 130 patients in the series and no additional fatalities. Practically all of the recent cases have been partial sections by the temporal route.

2. *Report of two failures.*—Two patients stated that the operation had been a failure. One of these, Mrs. S., underwent her operation in June, 1929, for a typical, severe, second and third division trigeminal neuralgia of several years' standing. All of the sensory root was cut, leaving the motor root intact. Frequent post-operative examinations have confirmed this. Yet despite total anæsthesia of the eye and forehead this patient states that the eye is painful all the time and that she suffers from frequent severe stabs of pain up over the forehead. She admits the former pain was cured by the operation, but that this is just as bad. She closes her letter by stating: "I would never advise anyone to have that operation." I have urged this patient to undergo another operation, a cerebellar approach might disclose a small endothelioma impinging on the sensory root close to the brain-stem, although one would assume the nerve would be completely degenerated and incapable of stimulation. Professor Linell suggests that in such a case a few ganglion cells may be scattered along the sensory root maintaining the viability of certain fibres.

The second patient, Mrs. B., underwent her operation in September, 1929. When she came under observation she was having excruciating stabs of pain through the upper jaw and up over the forehead. A complete section of the sensory root was performed and a careful post-operative examination demonstrated complete anæsthesia over the three divisions. Since her operation she has reported on several occasions, complaining of constant, severe, pulling, tearing pain through the side of the face. She moved to California and while there she consulted a doctor because she was in such terrible pain. A peri-carotid sympathectomy was performed without any relief. She consulted Dr. Rand, of Los Angeles, in May, 1931, and he reported that there was complete anæsthesia over the three divisions. The motor root was functioning. No further treatment was suggested. She is one of the "gasserian ghost" patients which occasionally haunt the surgeon.

3. *Eye complications.*—

No trouble	30
Serious impairment of vision	5
Slight impairment of vision	9
One or more attacks of inflammation in the eye, but vision still unimpaired	12
Total	56

These figures are rather alarming and a strong condemnation of complete section of the sensory root. Furthermore, our experience suggests that as time goes on more cases will fall into the group of "serious impairment of vision." For instance, one patient, Mrs. S. H., who underwent operation over a year ago, answered the questionnaire and stated that the eye had given no trouble, yet a few weeks ago there was a sudden flare-up of inflammation without apparent cause, and examination showed a shallow corneal ulceration. The lids have been sutured together and undoubtedly the ulcer will heal rapidly with this form of treatment, which if instituted early will result in healing without scar formation, whereas delay in closing the lids may be disastrous. This was exemplified by one of our patients who refused such treatment, and, although carefully looked after by a competent ophthalmologist, sufficient scar tissue formation took place to seriously impair vision.

In our experience there has been one cause only for these eye complications, namely trauma to an insensitive cornea. No trouble has been experienced during the patient's stay in hospital when the eye has been protected with a watch-glass shield, which suggests that true trophic ulceration from injury to the ganglion need not be feared as an immediate complication. Furthermore, there is evidence that there is no late result from trophic disturbance. Ten of our patients who had had a complete section of the sensory root, but no attacks of inflammation, were examined from five to six years after operation by Dr. R. J. P. McCulloch; special attention was paid to the condition of the corneal surface as seen with the loupe and corneal microscope. Following this study he concluded that complete section of the sensory root does not produce any change in the cornea, and that all of the eye complications encountered in this series were explained by injury to an insensitive cornea.

The utmost care has been taken to prevent these complications by giving the patient written and verbal instructions before leaving hospital. Unfortunately, many patients are unable to, or will not, follow these instructions, so that the percentage of eye complications will increase in this group as years go by. This is the strongest argument in favour of partial section; it matters not whether by the temporal or posterior ap-

proach, as trauma to the ganglion has not been a factor in this series. No matter when the root is cut, if the cornea is insensitive, eye trouble is to be expected in such a high percentage of cases that partial section is preferable, even at the risk of having to cut more fibres at a subsequent operation.

4. *Facial paralysis.*—Four of the 119 patients developed a complete facial paralysis following operation. In three patients the paralysis was noted immediately after recovery from the anæsthetic. In the fourth patient it probably developed some hours later. Fortunately, in each instance the paralysis recovered in from three to nine months, but until recovery was complete the eyelids were sutured together to protect the eye. The complication has not been encountered for some time, as great care is now taken to avoid pulling on the great superficial petrosal nerve as it leaves the anterior face of the petrous bone, thus preventing trauma to the ganglion of the facial nerve.

5. *Trophic ulceration of the nose.*—Two patients developed severe ulceration of the corner of the nose which alternately healed and broke down, and finally caused quite a disfiguring loss of tissue. Recently on the suggestion of Dr. Merle Scott, of Rochester, New York, the stellate ganglion was removed from one of these patients. This caused an increase of temperature in the side of the face and the ulceration healed rapidly. It is now possible to perform a plastic operation on this patient with some hope of success. One of these patients had rather an atypical neuralgia but the other patient was perfectly typical and of many years' standing; I have no explanation for the development of this unusual complication in these two patients. In each instance the blood Wassermann test was negative. Recently I have had another patient with ulceration of the nose following the complete removal of an acoustic neuroma with complete severance of the fifth, seventh and eighth nerves. At the time a hypoglossal facial anastomosis was being done on this patient the superior cervical ganglion was removed; this resulted in a rapid healing of the ulcer. It is wise to warn a patient against picking his nose after a section of the fifth nerve, which leaves this area anæsthetic.

PARTIAL SECTION OF THE SENSORY ROOT BY THE TEMPORAL APPROACH

1. *Results in general.*—Twenty-two patients answered the questionnaire, and it is satisfactory to note that 17, or 78 per cent, of these patients had no complaints. Of the 4 that had complaints one had slight stiffness of the jaw muscles and the other 3 had occasional, tingling, disagreeable pains in the anæsthetic area. They all stated that they were very satisfied with the operation and only mentioned these pains as they thought I would be interested to know about them. These patients underwent their operations from 1926 to 1932. It is of interest to note that four of them were relieved of pain which radiated over the forehead. In all, however, the pain had commenced in the second or third division and was initiated by some stimulus in these areas. None of them has so far developed a recurrence in the first division, and one does not anticipate a recurrence, because trigeminal neuralgia commencing in the first division is very rare.

2. *Report of one failure with partial section.*—Only three patients in the total series of 119 had a pure first division neuralgia. One of these three patients is of considerable interest. A male, M.W., aged 45 years, had had frequent attacks of severe pain in the right eye for six years. He described this as an agonizing pain which would suddenly clamp down on the right eyeball. It would last continuously for one-half hour and then suddenly disappear. This patient consulted both Dr. Adson and Dr. Frazier, who felt that the prolonged uniform character of the pain was atypical and advised against an operation. Operation was therefore undertaken with considerable misgiving and only because the patient was becoming a drug addict. An attempt was made to cut the sensory root, but the first division fibres were unintentionally left. A complete anæsthesia over the second and third division areas was obtained but the patient's pain was not relieved. At a subsequent operation complete relief was obtained when the remaining first division fibres were severed. Three years later the patient was well and at work. The case illustrated two points. First: in this patient the atypical steady type of pain was cured by section of the sensory root; and second, there are few cases where section of the first division fibres is essential, when the temporal approach is used. I question if partial

section close to the brain-stem, as advocated by Dandy,² would cure such a case; if it would, it is undoubtedly the operation of choice in all cases of first division neuralgia.

DISCUSSION

Partial section by the temporal and cerebellar approaches.—As there were only three patients in this series with a pure first division neuralgia, it is quite likely that most if not all of the remainder could have been cured by a partial section. This statement is made with the knowledge that many of the patients had a spread of pain up into the first division area but the pain was initiated in the second or third divisions. A sufficient number of these patients have been cured by a partial section which did not even give a complete anaesthesia over the whole second division, which makes us feel that this type of operation could have been applied to many more patients. Subsequent operations may be necessary in this group, but so far there has not been a recurrence and we are so impressed by this that recently a complete section has been performed very infrequently. The amount of anaesthesia obtained has been quite variable; always there has been a complete anaesthesia of the third division area over the tongue and lower lip, occasionally a complete loss over the second division area, but more often only a small area over the upper lip is completely insensitive; frequently the auriculo-temporal area of the third has escaped, even though there is anaesthesia in part of the second division area, the only conclusion being that the fibres supplying the auriculo-temporal area of the third division may occupy a position in the root mesial to some of the second division fibres.

Dandy on page 196, in Volume 12, of Dean Lewis' Surgery, makes the following statement in referring to his operation by the cerebellar approach: "It has been empirically discovered through the use of this operative procedure that when the posterior half of the sensory root is divided, sensation to the entire face remains essentially unchanged." This statement does not agree with my observations on two patients where an exactly similar procedure was carried out, so far as one can judge from his description and diagram (Fig. 1). In these two patients there was essentially the same sensory loss in every respect as has been observed with partial section by the temporal route, namely, complete

loss for all forms of sensation over all the third division and the lower part of the second division area. Davis,³ on the basis of experimental work on cats, feels that partial section of the sensory root as outlined above should sever first division fibres, an opinion at variance with the

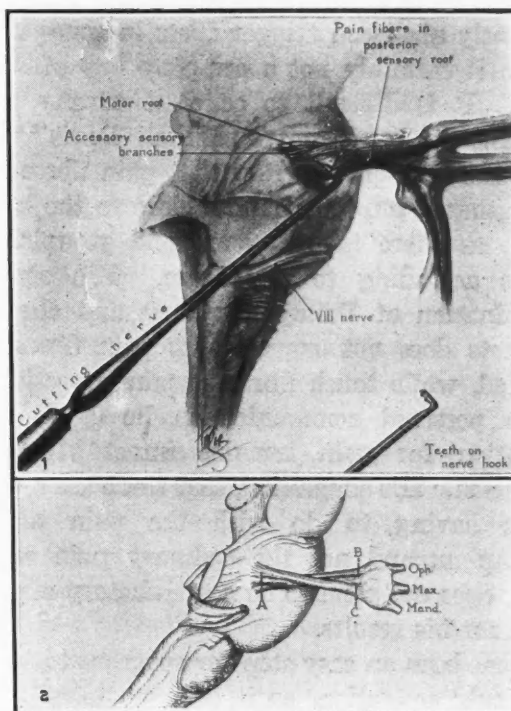


FIG. 1.—Diagram showing method of partial section of the sensory root (Dandy). From the results of our cases it is our impression that the fibres which are responsible for the pain of tic douloureux in all three branches are included in the posterior half of the sensory root. They (represented by the dark lines) concentrate in this part of the sensory root. Removal of the bundle does not affect pain induced by sensory stimuli but only the pain of tic douloureux. (Reproduced from vol. 12, of Dean Lewis' Practice of Surgery, Fig. 75, with the kind permission of the publishers).

FIG. 2.—Shows the location of the sections of the sensory root which were performed on experimental animals. (Reproduced with the kind permission of Loyal Davis from *Arch. of Neurol. & Psychiat.*, 1933, 29: 1, Fig. 61).

findings in our two patients. From a study of Fig. 2, reproduced from Davis' article it would appear as though a section a little farther from the brain-stem would produce sensory changes similar to the changes in my two patients. Fig. 1, reproduced from Dandy's article, does represent and correspond with our dissections, and we are at a loss to explain why in his patients there is not the expected loss of sensation over the third and second division areas similar to that found in our two patients; possibly in his patients the section is actually made closer to the brain-stem than pictured, in which case, owing to the arrangement of the fibres, a shallow cut

might involve all three divisions, not to such an extent as to cause any obvious sensory loss, yet stopping the pain of *tic douloureux*, because it is conceivable that a slight diminution of sensation will abolish the trigger spots. This possibility is suggested in some of our patients where partial section by the temporal route has apparently abolished trigger spots in zones where there is certainly not a complete loss of sensation. It is difficult to conceive of any other explanation for Dandy's results. Davis²³ work does not support the view that pain fibres may be gathered into one bundle close to the brain-stem, as there is no microscopic grouping of fibres according to their size. The sensory examination of Dandy's patients and our two patients does not suggest that pain fibres are severed, while touch fibres remain unsectioned. In a personal communication he states that sensation for pain remains intact after his operation. His suggestion, that there are special fibres having to do with the pain of *tic douloureux* and not the ordinary pain sensations, does not seem to be a satisfactory explanation for his results.

It has been an easy step for surgeons to adopt Frazier's¹ operation, as it is a modification of the well-established and familiar operation of exposure and section of the sensory root by the temporal route. However, some surgeons are still reluctant to adopt it because of the possibility of a recurrence of the pain in the area supplied by the unsectioned portion of the nerve. In time Dandy's viewpoint may be substantiated and his operation more universally adopted. The results with partial section by the temporal route have been so satisfactory that I have reserved the cerebellar approach, which, for me at any rate, is a more difficult and hazardous procedure, for a few patients where a posterior lesion has been suspected or where it is advisable to cut the glossopharyngeal nerve

in addition to the fifth, as is frequently necessary in giving relief to those suffering from carcinoma involving areas supplied by both these nerves.

CONCLUSIONS

1. Partial section, by the temporal route, is a much more satisfactory procedure than complete section. This includes the fairly common type of patient in whom the pain commences in the second and third divisions and spreads up through the eye and forehead. In these patients the main trigger spots are in the second and third division area, and partial section is usually indicated, even though a subsequent operation may occasionally be necessary.

2. Complete section is condemned because of the number of severe eye complications. It is only definitely indicated in the comparatively few patients where the pain commences in the first division area.

3. Partial section by the temporal route is such a satisfactory, safe and simple procedure that the cerebellar approach advocated by Dandy has only been adopted occasionally. It is especially indicated when it is considered necessary to cut both the glossopharyngeal and trigeminal nerves, and in patients where the presence of a small angle tumour is suspected. In two patients on whom partial section was performed after the manner described by Dandy the sensory loss was identical with that usually found after partial section by the temporal route; these findings are at variance with the viewpoints of Dandy and Davis, the latter feeling that a partial section as described should cause the greatest sensory loss in the first division area, whereas Dandy states that there is no sensory loss.

REFERENCES

1. FRAZIER, *Arch. Neur. & Psych.*, 1925, 13: 378.
2. DANDY, *Arch. of Surg.*, 1929, 18: 687.
3. DAVIS AND HAVEN, *Arch. of Neur. & Psych.*, 1933, 29: 1.

THE DIAGNOSIS OF SCARLET FEVER.—“The difficulty attending the arrest of an epidemic of scarlet fever emboldens me to give the following particulars of an epidemic which passed through my hands some years since, and was only arrested after some four months of it. Sixty-nine cases in all were sent to the local isolation hospital out of some three hundred boys. The first two cases were severe and unmistakable. The Dick test was made use of, Dick-positive individuals being subsequently immunized. The latter proved to be carriers during their immune period. Very early the symptoms ceased to be characteristic—some slight increase of pulse rate and possibly some

sore throat. The only definite symptom manifested throughout was a slight œdema of the skin, with some doubtful rash in a few cases. The skin felt rough and dry. On picking it up it was thickened, and the normal limit of the epithelium was indefinitely demarcated from the subcutaneous tissue. This skin symptom came to be regarded as pathognomonic among those who had been exposed to infection, and isolation followed. The correctness of the diagnosis was indicated by the fact that, with two exceptions, all subsequently peeled and the epidemic ceased. Examination of throat swabs for hæmolytic bacteria proved of the greatest value.”—Dr. F. R. Humphreys (Wokingham), in *Brit. M. J.*, 1933, 2: 222.

RECENT ADVANCES IN THE DIAGNOSIS OF CARCINOMA
OF THE PROSTATE*

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XII

THE chief misconception that precludes an early diagnosis of prostatic cancer in many instances is the popular supposition that all carcinoma of the prostate originates in the posterior lobe. Randall¹² states that it was impossible to correlate the findings of his study with the idea that hypertrophy invariably originates in or at any one fixed area, or in one set group of prostatic gland acini. In the section of his book dealing with carcinoma of the prostate he states further: "There is no evidence found in this series to substantiate a previous conception that is prevalent in the literature that malignancy of the prostate has its origin in the posterior lobe." Young¹⁸ had occasion a few years ago to write a paper on 25 cases of carcinoma of the prostate in which the diagnosis had been missed, due to the softness of the organ and the absence of notable infiltration in the posterior lobe. Bothe,² in 50 cases of obstruction at the bladder neck, found that cancer had originated in the glands of Albarran in two instances, while in one the point of origin was in the posterior commissural glands. In all three instances the remainder of the organ was not involved by cancer. In my material 12 per cent of 205 carcinomas of the prostate either originated in or involved the lobules about the bladder neck, with little evidence of infiltration elsewhere.

I have tabulated a total of 1,426 cases wherein the prostate was removed under a diagnosis of benign enlargement, and in which 183 early or borderline cancers were found (Table I). In every case cancer was unsuspected during life. Each of the authors states that the unsuspected cancer was found in either the lateral or median lobes; not one is reported as being found in the posterior lobe. To this total we may well add the 17 cases of carcinoma found by Randall in

312 autopsies showing obstruction at the bladder neck. His conclusions we have already referred to. Further evidence is afforded by the routine practice of aspiration biopsy. By this means I have been able to demonstrate carcinoma in a single small nodule in one lateral lobe in the absence of demonstrable cancer elsewhere in the organ. It is, therefore, denied that carcinoma originates solely in the posterior lobe. On the contrary, it may, and does, originate in any

TABLE I.
INCIDENCE OF EARLY AND BORDERLINE CANCERS
IN SUPPOSED BENIGN DISEASE

Authors	Prostates Examined	Early or Borderline Cancer Found
Wilson and McGrath ¹⁶	468	73 early
Swan ¹³	28	4 early
Eastes and Fletcher ⁶	678	58 borderline and early
Wade ¹⁵	134	14 early
Thompson-Walker ¹⁴ ..	100	16 early
Bugbee ³	7	7 early
Hirsch and Schmidt ⁹ ..	11	11 early
Randall ¹²	312	17 early and advanced
Total.....	1,738	200

portion of the organ or its accessory lobules. This conception is most important in the recognition of early carcinoma of the prostate, particularly when the disease involves the lateral or median lobes or the accessory lobules at the bladder neck.

CLINICAL CLASSIFICATION

Clinical experience teaches that carcinoma of the prostate varies widely in its manifestations. Pathologists have observed the true significance of this variation perhaps better than have clinicians. Wolff¹⁷ observed that 39 per cent of his autopsied cases survived less than one year, while 24 per cent survived more than three years after the initial symptom. Ewing⁷ notes that the course of prostatic cancer varies from that of rapid cases occurring in middle life and terminating within a few months to the more prolonged cases which extend over three years or more. In Dossot's series⁵ the majority sur-

* Preceding articles in this series can be found in the *Journal*, 1932, 27: 521, 612; 1933, 28: 30, 182, 246, 392, 521, 602; 29: 167, 290, 402.

vived only 6 to 18 months, while some survived three years and even longer. Clinicians generally, however, have made no attempt to separate the cases according to their clinical manifestations and thereby establish a prognosis more in keeping with the natural history of the disease.

PERSONAL OBSERVATIONS

In 501 cases (205 autopsy, 296 clinical),* three distinct types of carcinoma of the prostate were recognized. These may be distinguished by an arbitrary clinical index of malignancy, or simply by attaching proper significance to the age of the patient, the duration of symptoms, the residual urine and the extent of the disease. For purposes of discussion these groups are designated as A, B and C. Each is characterized by its own syndrome, pathological features, and individual group prognosis (Table II).

TABLE II.
CLINICAL INDEX OF MALIGNANCY

<i>Index Factors</i>	<i>Group "A"</i> (least malignant)	<i>Group "B"</i> (intermediate)	<i>Group "C"</i> (most malignant)
Aged	over 65	56 to 65	under 55
*Residual urine	200 c.c. and over; frequent; comp. reten.	100 to 200 c.c.	under 100 c.c.
Duration of symptoms	over 21 months	11 to 20 months	under 10 months
Extent of disease	no pain; no demonstrable metastases	pain; no demonstrable metastases	pain and demonstrable metastases
Prognosis when untreated.	30 months to many years.	7 to 30 months, average 18 months.	up to 1 year, average 6 months.

Group C.—This group shows the highest degree of clinical malignancy. The prognosis is bad, the average survival being but six months after the recognition of the disease. Clinically, the group was characterized by a relatively early age of onset, usually under 55; the

* The autopsy material included in the above series was collected by the author from many separate sources. I am indebted to the pathologists and clinicians of the following institutions for permission to use their material:—The State Institute for the Study of Malignant Disease, Buffalo, New York; Massachusetts General Hospital; New York City Cancer Institute; New York Hospital; Philadelphia General Hospital; University of Pennsylvania Medical School; University Hospital, Philadelphia; Johns Hopkins Hospital, Baltimore; Grasslands Hospital, Valhalla, New York; Bellevue Hospital.

first symptom was noted less than ten months prior to examination; the residual urine was low, often less than 100 c.c.; while pain and widespread bony and visceral metastases were the rule, urinary symptoms were few, and frequently the initial symptoms were due to metastasis. The disease often escaped recognition in my collected autopsy material.

Ewing has emphasized that the clinical course of carcinoma of the prostate is very notably dependent on the structural type of the tumour, so that different forms appear as radically different diseases. The structural character of the tumours in Group C is illustrative of the truth of this statement. These neoplasms were nearly all of the small-cell variety, highly anaplastic, frequently almost indistinguishable from the round-celled sarcomas. They arose in organs not obviously the seat of prior hypertrophic changes. The primary tumour was, therefore, usually small in size and, due to the diffuse uniform invasion of the stroma, regular in outline, and rather elastic in consistence. In cases exhibiting very rapid growth the tumour may actually be soft. The lymphatics in the prostate were uniformly invaded by the time the disease was recognized and the small veins were thrombosed by tumour in 36 per cent of the cancers in this series.

The perineural lymphatics in tumours of the prostate are of especial interest. In the 205 autopsied cases studied the perineural lymphatics were invaded by cancer in 52 per cent. Metastasis to the bones occurred in 30 per cent of this series, while pain constituted a major complaint in over 60 per cent of the cases. This would tend to show that pain in the absence of bony metastasis was probably due to the actual infiltration of the lymphatics of the nerve sheaths, and not, as many observers contend, to the pressure of surrounding lymph nodes. Infiltration of the perineural lymphatics occurred in increasing ratio in groups A, B and C, accounting for the high incidence of pain in the latter group. The uniform involvement of the lymphatics, the frequent infiltration of the veins, which in three instances resulted in thrombosis of the iliac vessels and once of the vena cava, accounts for the early and widespread metastases which clinically characterized this group.

Group B.—Intermediate in gravity, and merging imperceptibly into groups C and A, this group is rather difficult of description.

The prognosis, however, is clearly indicated. The average survival was 18 months and varied from 7 to 36 months. Less than 18 per cent survived more than 2 years. Clinically, the group was distinguished by an age-incidence of 55 to 65; the symptoms were of 10 to 20 months' duration; the residual urine was moderate in amount (100 to 200 c.c.), and while there may or may not have been demonstrable bony metastases, pain was a prominent symptom. Urinary symptoms were distressing, difficulty and frequency being marked. Usually, the original symptom was urinary, followed shortly by pain, loss of weight and weakness, indicating rapid extension of the disease. Histological examination of the tumours in this group showed that the disease arose most frequently in the small fibrous prostate, long the seat of chronic interstitial prostatitis. Keyes¹⁰ has emphasized that symptoms due to the latter condition supervene nearly a decade earlier than those due to benign hypertrophy; hence, the earlier age incidence of cancer in this group. The cancer arises in the terminal alveoli as a typical adeno-carcinoma and rapidly invades the stroma, producing a small stony hard irregular tumour easily recognized by the examining finger. The lymphatics in the organ are invaded early, especially the perineural lymphatics. This event predicates early metastasis to the regional lymph nodes—92 per cent in this series. The perineural lymphatic infiltration, while not as frequent as in group C, accounts for the early onset and high incidence of perineal, sacral and sciatic pain noted in group B cases. Microscopically, the tumour is highly invasive, anaplastic and rapidly loses its adenoid character. Grossly, the order of extension of the disease appears to be, first—to the regional nodes, second—direct extension, and, later—metastasis to the viscera and bones.

Group A.—In this group the disease ran a relatively benign course. The prognosis is better, over two-thirds of the cases in this series surviving more than three years, many for five to ten years without benefit of treatment. The patient had usually complained of urinary symptoms for two years or more prior to examination. The peak age incidence was slightly beyond 65 years. Residual urine was high and there was frequently complete retention. Demonstrable metastases were rare, and pain, other

than that due to retention or difficulty in voiding, was not usually noted. Many cases were diagnosed as benign hypertrophy, due to the large size of the organ, the occasional softness, and the demand of the patient for relief from retention. The true nature of the process was often discovered in the laboratory after the removal of the supposedly benign tumour.

Study of the pathology of the tumours in group A explains some of the difficulties of diagnosis. The cancer arose rather uniformly in multiple foci on a pre-existing benign hypertrophy. Grossly, the cancer may involve any or all of the separate lobes of the organ, or may even be primary in, and confined to, the accessory glands at the bladder base. Likewise the disease may arise centrally in the larger ducts, leaving a wide surrounding area of soft adenoid tissue characteristic of benign hypertrophy. In such a case the microscopic picture may be that of epidermoid carcinoma rather than the typical adenocarcinoma. More rarely the disease may arise in a single focus in any lobe of the organ, producing a papillary cystic adenocarcinoma, as in a case reported by Barringer.¹ The typical microscopic picture of the tumour in this group was that of adenocarcinoma, adult-cell type, in more or less perfect alveolar arrangement. Diffuse invasion of the stroma occurs only late in the disease. Permeation of the lymphatics was also a late event, usually preceded by direct and sometimes massive extensions to the neighbouring organs and tissues. When metastasis occurred, the regional nodes were the first to suffer. Distant metastasis to the bones was rare, but direct extension into the pubes, ischium and ilium was more common, late in the course of the disease. With these features in mind the findings on rectal examination are less confusing. The diagnosis may be missed, due to the absence of characteristic hardness and the presence of oedematous adenoid tissue between the examining finger and the tumour nodules. Relief of obstruction by the catheter or treatment by x-ray may relieve the oedema so promptly that the diagnosis is readily made on subsequent examination, as noted by Dean.⁴ The more usual picture in early cases consists in the presence of multiple small nodules of characteristic hardness. The confluence of these nodules into a diffuse irregular mass of considerable size is typical of the advanced case.

ASPIRATION BIOPSY

Careful study of the clinical setting of the individual case, as above outlined, may be sufficient for accurate diagnosis. On the other hand, the examiner will be left in doubt in many cases. To settle the issue in these instances and to avoid the possibility of error, aspiration biopsy is regularly applied to all prostatic admissions at the Memorial Hospital. This method was first introduced by Martin and Ellis¹¹ in 1926. Following the suggestion of Martin, the author has applied the method to the diagnosis of prostatic tumours since 1929 with complete satisfaction.

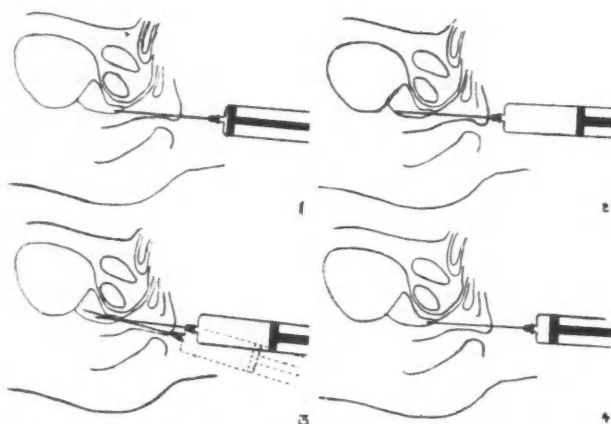


FIG. 1.—Prostate in sagittal section showing needle and syringe in first position. Note point of needle just within capsule of prostate and syringe closed.

FIG. 2.—Plunger of syringe held out as needle is advanced in straight line through suspected prostatic tissue.

FIG. 3.—Syringe in solid outline in third position, withdrawn about 0.5 to 1 cm.; suction maintained. In dotted outline, syringe is again advanced but at a different angle in order to cut off plug of tissue in bore of needle. Suction maintained.

FIG. 4.—Needle withdrawn to prostatic capsule. Syringe allowed to equalize slowly. Disconnect needle from syringe and quickly withdraw needle.

The technique is as follows. The patient is placed in the lithotomy position on the table. The skin of the perineum is cleansed with alcohol. A single wheal of 1 per cent novocaine is raised on the skin just to one side of the median raphe about 1 in. anterior to the anus. This is followed by the infiltration of novocaine down to the prostatic capsule, guided by the index finger of the left hand placed in the rectum. The sterile record syringe, with an 18 gauge needle, 4 to 6 in. long, with long sharp bevel, is now taken in the right hand and inserted through the skin of the perineum avoiding the midline. With the index finger of the left hand in the rectum the needle is now carefully guided to the prostatic capsule avoiding

both the rectal and urethral walls. Fig. 1 shows the position of the needle in the sagittal section at this juncture and also shows that the insertion up to this point has been accomplished with the plunger of the syringe closed. Now the plunger is drawn out as far as possible, creating a high vacuum in the system, as the needle is advanced in a straight line through the suspected nodule of tissue. This step is illustrated in Fig. 2. The result of this step is that a small plug of tissue is sharply cut and drawn up into the needle. In order to cut off the tissue and successfully withdraw it, it is necessary to withdraw the needle about 0.5 to 1 cm. and then advance it again, but at a different angle, as illustrated in Fig. 3. During this manipulation it should be noted that negative pressure is continuously maintained by holding the plunger of the syringe out. The needle is now withdrawn to the prostatic capsule, the pressure in the syringe slowly allowed to equalize (Fig. 4), and the syringe disconnected from the needle. The needle is now quickly withdrawn. The material in the needle is then slowly and carefully expressed on to a glass slide by reinserting the obturator through the needle. It is then smeared with a second glass slide using firm but gentle pressure, as for a blood smear. Care should be taken to get the preparation thin enough for good visualization. Fixation is by gentle heat, after which the specimen is rapidly stained according to the technique described by Ellis.

Ellis describes two methods of preparation of the specimen, one only being generally applicable to smears of tissue from the prostate. The other method is a paraffin-embedding method, to be utilized when larger amounts of tissue are obtained by the needle. This happens frequently with other tumours but rarely with the prostatic. The immediate method is as follows. The fresh tissue fragment on the glass slide is smeared by very firm flat pressure by another glass slide drawn once across. The smeared slide is fixed by gentle heat until warm and dry and is then run through with the following technique.

	Minutes
1. Alcohol (95 per cent).....	1
2. Water.....	1
3. Haematoxylin.....	1
4. Water.....	1
5. Eosin.....	1
6. Alcohol (95 per cent).....	1½
7. Carbol-xylol.....	1½
8. Mount with Canada balsam and cover glass

The times given may be varied slightly, and it is especially suggested that the staining of the specimen with hæmatoxylin be followed under the microscope.

The interpretation of the smear requires the services of a pathologist fully conversant with the field of tumour diagnosis. He must be associated with a clinician whose clinical interpretation of the facts of the case is accurate and reliable. In these smears careful search reveals small groups of cells having the definite cytological structure and morphological arrangement of cancer. While it would be very unwise to base a diagnosis on a single cell or very small group of cells, yet it is easily possible to find enough material scattered throughout the smear which when carefully studied can lead only to the definite conclusion that the tissue is or is not cancer. Gross morphological structure, such as one would find in well cut paraffin sections, is of course not to be found. Many pathologists would not be willing to hazard a diagnosis on such a small amount of tissue, but we know that with painstaking technique and a pathologist able and willing a reliable diagnosis of cancer can be made on material obtained as described. Where such conditions do not prevail we would hesitate to recommend the procedure. Under properly organized conditions we feel that the method of biopsy described can be safely and routinely used in the diagnosis of prostatic neoplasms with a higher degree of success and

satisfaction than with any method heretofore proposed.

SUMMARY

Early diagnosis of cancer of the prostate will be facilitated by wider recognition of the fact that the disease may originate in any portion of the organ.

The variations in the clinical setting of the disease, depending upon the age of the patient, the previous state of the organ, the structure of the tumour, and the mechanics of obstruction, are emphasized.

The anatomical basis and significance of pain other than that due to urinary obstruction are discussed.

A simple and reliable technique for securing a biopsy specimen from the prostate by means of a record syringe and an 18 gauge needle is described.

REFERENCES

1. BARRINGER, *Proc. Gen. Urin. Sect. N.Y., Acad. Med.*, 1931.
2. BOTHE, *Pennsylvania M. J.*, 1931, 34: 383.
3. BUGBEE, *J. Urol.*, 1929, 22: 363.
4. DEAN, *Am. J. Surg.*, 1930, 8: 988.
5. DOSSOT, Thèse de Paris, 1926.
6. EASTES AND FLETCHER, (quoted by Swan).
7. EWING, *Neoplastic Diseases*, 3rd ed., Saunders, Phila, 1928, p. 824.
8. FERGUSON, *Am. J. Surg.*, 1930, 9: 507.
9. HIRSCH AND SCHMIDT, *J. Urol.*, 1928, 20: 387.
10. KEYES, *Urology*, Appleton, New York, 1923.
11. MARTIN AND ELLIS, *Ann. Surg.*, 1930, 92: 2.
12. RANDALL, *Surgical Pathology of Prostatic Obstructions*, Williams & Wilkins, Balt., 1931, p. 207.
13. SWAN, *The Lancet*, 1923, 2: 971.
14. THOMPSON-WALKER, *The Lancet*, 1922, 2: 1121.
15. WADE, *Ann. Surg.*, 1914, 59: 321.
16. WILSON AND McGRATH, *Surg., Gyn. & Obst.*, 1911, 13: 647.
17. WOLFF, *Zeitschr. f. Chir.*, 1899, 53: 126.
18. YOUNG, Tumours of the Prostate, in *Lewis' Practice of Surgery*, 1930, 9: 27.

HISTOLOGY OF THE APPENDIX IN MEASLES.—W. H. Schultze (*Münch. med. Woch.*, April 14, 1933, p. 576) describes a case which, having been diagnosed as early appendicitis, and the appendix having been removed, turned out to be not appendicitis but measles. The patient, a girl of 10 years, had often complained of abdominal pain without any cause for it being found. A few days before coming under observation the pain recurred; there was vomiting but no fever. On admission to hospital the patient simply had a coated tongue and an abdomen somewhat sensitive to pressure; temperature was 37.4° C. The appendix was removed, but there was no exudate; there were some old adhesions and some enlargement of the mesenteric glands. Histological examination gave no evidence of an acute appendix; there was some connective-tissue thickening of the serosa. The striking finding was darkly-staining giant cells, which were present in great numbers in the mucous membrane between the well-preserved and well-stained cylindrical epithelial glands. The nuclei of these giant cells were as big as those of lymphocytes and numbered ten or more in one cell.

The lymphatic tissue of the appendix was richly present. The author emphasizes that such an appearance of giant cells in the appendix had never before been seen, although all appendices removed at his hospital had been carefully examined for many years. Findings similar to these had been described by Finkeldey in the prodromal stage of measles, and careful comparison with this worker's sections showed that Schultze's case was of an identical nature. The child in the present case developed the rash two days after the operation, and measles was fully established one day later. Changes of the above kind have been described in the tonsils during the prodromal stages of measles and may be regarded as characteristic for this disease. Discussing the significance of the giant-cell phenomenon in the pathology of measles, Schultze considers two possibilities; either it is a question of a direct effect of the virus, in which case one has to consider whether the tonsils and appendix may not be the portal of entry, or it may be a sensitization reaction. This can only be decided by a knowledge of the changes which appear in the other lymphatic structures in the body.—*Brit. M. J.*, 1933, 2: Ep. 22.

CARCINOMA OF THE PROSTATE*

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XIII

THERE is a peculiar fascination in backing lost causes. The reason for this is that medical science considers no cause wholly and irrevocably lost; it believes that there is no disease which sooner or later may not be controlled. Prostatic carcinoma is to-day fairly firmly established in the lost-cause column. Even Young, that ardent and skilful advocate of the operative cure of prostatic carcinoma, finds but little over one case a year suitable for operative removal. From 1904 to 1927 he reports but 27 cases in which cancerous prostates have been radically removed.

The problems of the control of this disease are so many and varied and the difficulties so great that in most clinics both here and abroad attention is centred wholly on the urinary obstruction which may be caused by the carcinoma, rather than upon the control of the disease. Only isolated cases of cure are published. No attempt is made to suggest what certain percentage of all cases seen may be controlled (cured?). The reasons for this are many.

COMPARISON BETWEEN PROSTATIC AND BLADDER CARCINOMA

It is always interesting to me to compare prostatic and bladder carcinoma, two diseases starting often within two or three centimetres of each other, yet so wholly different in pathological anatomy, symptoms and prognosis. Both are semi-internal growths. Prostatic carcinoma starts in the centre of a gland surrounded by dense fascias; the fascia of Denouvielliers posterior to the prostate, between it and the rectum; the fascia of the bladder base and the capsule of the prostate itself. There is no open space into which the prostatic cancer may grow. It therefore pushes between or through the fascias, becomes peri-prostatic and involves the lymphatics early in its history. Bladder cancer starts in the mucous membrane of the bladder, grows

in the path of least resistance, the bladder cavity, and invades the lymphatics beyond the bladder late in its course. Prostatic carcinoma often causes urinary obstruction, bladder carcinoma, rarely. Hæmaturia, that symptom which early in the disease calls attention to the possibility of a bladder growth, occurs in prostatic carcinoma only after the growth has broken through into the bladder. A prostatic growth may be palpated through the rectum and this is the most important feature in the diagnosis. Inspection through the cystoscope gives us the most help in the diagnosis of bladder carcinoma. A specimen may be easily obtained from the bladder growth, which is not the case with the prostatic one. Both the operative removal and the treatment by radium are much simpler procedures in bladder carcinoma than in prostatic. And finally the prognosis is quite different. We can control for five or more years from 25 to 40 per cent of bladder carcinomas, the variations in percentages being caused by variations in malignancy. We can control for five years or more (and here I am willing to break precedents and commit myself) between 10 and 20 per cent of prostatic carcinomas.

CONCEPTIONS OF THE GROSS PATHOLOGY OF PROSTATIC CARCINOMA

The work of Geraghty and Young seemed to establish the fact that a large percentage of cases of prostatic carcinoma started in a single focus in the posterior lobe of the prostate and grew up between the fascia of the bladder base and the fascia of Denouvielliers behind the bladder. The anatomical work of Randall, of Philadelphia, and Ferguson, of our staff, seems to indicate that the posterior lobe origin is relatively rare, that the prostatic carcinoma may start in any of the lobes, and, indeed, that there are frequently multiple foci of origin in the different lobes.

A point of still greater importance bearing on the choice of treatment is the early infiltration of the capsule of the organ by the neoplastic process. Before local extension can be appreci-

* Preceding articles in this series can be found in the *Journal*: 1932, 27: 521, 612; 1933, 28: 30, 182, 246, 392, 521, 602; 29: 167, 290, 402, 497.

ated the new growth has frequently invaded the fibromuscular capsule by way of the loose cellular septa, gaining ready access to the small venules of the surrounding prostatic plexus. These veins are rapidly invaded by tumour cells, rendering surgical intervention an impossibility without immediate dislodgment of emboli, followed by distant metastasis. While we are not yet armed with the figures, we believe that this type of extension occurs early and with almost as great frequency as does extension by way of the lymphatics and the regional nodes. Certainly both events precede the direct gross anatomical extensions of the disease. The involvement of the capsule in the manner described is often noted by the surgeon when he fails to find a satisfactory "line of cleavage" between the gland and its capsule. It also explains the prompt and frequent post-operative recurrences, as few operators are so radical as to remove the last shred of infiltrated capsular tissue along with the entire venous plexus. Nor is this all. We have further evidence of a convincing nature that adenocarcinoma is frequently primary in the accessory prostatic glands at the bladder base, variously termed the subcervical group of glands of Albarran, etc., these tumours later extending into the substance of the prostate proper, fungating through the bladder mucosa or both. Further, the earliest direct extension of the disease, when primary in the true prostate, is frequently in the direction of this group of accessory glands. In our material, primary or secondary involvement of this group is more frequent than the time-honoured extension to the seminal vesicles.

Pelvic lymphadenopathy occurring in a very high percentage of all cases of carcinoma of the prostate, a high early incidence of capsular infiltration, and venous thrombosis by tumour cells, frequent primary or secondary involvement of the accessory glands at the bladder base, all often present when the patient is first compelled to seek advice, and constitute an insurmountable barrier to the successful surgical treatment of the disease, no matter how radical its conception and execution.

AGE-INCIDENCE

The age-incidence of cancer of the prostate does not differ greatly from that of benign hypertrophy, so that this factor alone is of little value in differential diagnosis.

TABLE I
AGE-INCIDENCE ON ADMISSION OF CARCINOMA OF THE PROSTATE IN 227 OF 280 CASES STUDIED AT THE MEMORIAL HOSPITAL.

	Number of cases	Percentage of group
Under 34	1	0.4
35 to 39	3	1.3
40 to 44	3	1.3
45 to 49	6	2.6
50 to 54	26	11.4
54 to 59	42	18.5
60 to 64	44	19.3
65 to 69	50	22.0
70 to 74	35	15.4
75 to 79	13	5.7
80 to 84	3	1.3
85 to 89	1	0.4
Total ages 50 to 75	197	86.6
Total entire group	280	99.6

The peak age group for benign hypertrophy occurs, according to Young, at fifty-five to fifty-nine. The peak age group for cancer in our series is at ages sixty-five to sixty-nine, ten years later. However, this is of academic interest only, for the difference for each five-year period is relatively slight. We present a Table of age-incidence comparing groups reported by various authors with our own experience.

TABLE II
AGE-INCIDENCE OF CARCINOMA OF THE PROSTATE

Ages	Young, 1909 111 Cases	Bumpus, 1921 361 Cases	Deming, 1922 100 Cases	Barringer, 1930 280 Cases
	Per cent	Per cent	Per cent	Per cent
40 to 50	1.8	2.7	3.0	3.9
50 to 60	22.5	21.6	17.0	29.9
60 to 70	45.5	51.2	45.0	41.3
70 to 80	27.0	22.1	25.0	21.1
80 to 90	3.6	1.2	10.0	1.7

The statistics show no marked disagreement, but our experience shows a slight increase in the earlier age groups, with a corresponding decrease in the later years. However, these are all relatively small series and a truer picture would probably be given by averaging all the figures.

SYMPTOMATOLOGY

The symptoms of cancer of the prostate are not easily differentiated from those of benign hypertrophy, for both conditions are often present at the same time. A prostatic carcinoma is frequently superimposed upon a benign hypertrophy, but many cancers develop in non-hypertrophied prostates as well. An earlier diagnosis usually is made where the neoplastic

process develops subsequent to the benign hypertrophy. It is not surprising that even competent urologists often fail to recognize these superimposed cancers, as the true condition is often masked by œdema. Hard carcinomatous nodules are easy to miss when covered by œdematous prostatic tissue. We have found that after subjecting these doubtful or suspicious superimposed cases to a cycle of high voltage x-ray, causing the œdema of the hypertrophied organ to disappear, the diagnosis is easier. Then the hard cancer tissue stands out sharply defined from the elastic enlargement of the benign hypertrophy.

The initial symptoms of carcinoma of the prostate fall into two main groups: (1) urinary symptoms, and (2) pain. The urinary symptoms are usually the first observed by the patient and therefore the most important from the point of view of early diagnosis. The two most common symptoms occurring early in the disease are frequency and difficulty of urination. In 82 per cent of our 280 cases these two symptoms were the first exhibited. Other common symptoms associated with the above are nocturia, retention, hæmaturia, urgency and incontinence.

TABLE III

INITIAL SYMPTOMS OCCURRING IN 280 CASES OF CANCER OF THE PROSTATE

Symptom	Number	Per cent
Frequency	134	47.8
Difficulty	96	34.2
Nocturia	79	28.2
Dysuria	60	21.4
Retention	45	16.0
Backache	26	9.2
Hæmaturia	24	8.5
Pain in thighs and legs	19	7.5
Pain in lower abdomen	14	5.0
Urgency	12	4.2
Incontinence	11	3.9
Constipation	10	3.5
Pain in hips	9	3.2
Loss of weight	8	2.8
No urinary symptoms	8	2.8

The symptoms of pain which cause the patient to consult his physician are, in the order of their importance: painful urination, backache, pain down the thighs and legs (sciatica), pain in the lower abdomen and pelvis, pain in the hips, groin, penis, rectum, and perineum. Most of these are late symptoms, due to direct invasion of the bladder neck, to pressure on nerve trunks by invaded pelvic nodes, obstruction to the venous circulation from the same cause, or to distant metastases, especially to the bones.

We here present a tabulation of the initial symptoms occurring in 280 cases of cancer of the prostate.

Usually patients presented three or more symptoms at the onset, which caused them to consult a physician. The most common triad was that of frequency, difficulty and nocturia. Many patients waited, however, until retention or hæmaturia compelled them to seek advice. Retention in itself is not indicative of far-advanced cancer. It is often caused by associated benign hypertrophy. Diligent search for carcinomatous changes in the prostate of the retention case will often lead the surgeon to an early diagnosis of prostatic carcinoma. Many of our patients' histories indicate the possibility of much earlier diagnoses had their physicians made careful digital examinations at the time of the first attack of retention. In our series, an average of twenty-four months had elapsed between the appearance of initial symptoms and our first examination. Hæmaturia, on the other hand, is seldom an early symptom, usually occurring only when the tumour has invaded the posterior urethra or bladder. Twenty-four, or 8.5 per cent, presented hæmaturia as the initial symptom, and 39, or 13.9 per cent, as a subsequent symptom. Hence a total of 63 had hæmaturia at some time in the course of the disease, cystoscopic examination proving 41 of these to have extension of the neoplastic process to the bladder.

Occasionally there are no urinary symptoms in well-advanced cases of prostatic cancer, as in 8 of our patients. In these 8 the symptoms were referred to the gastro-intestinal tract and the genital organs. One consulted his physician because of persistent diarrhœa; another because of rectal bleeding for which he was subjected to hæmorrhoidectomy, the true nature of his disease becoming apparent only after the failure of the operation to relieve his symptoms. A third complained of curved erections of the penis over a period of three years, due to direct invasion of the corpora by prostatic cancer. The fourth had a colostomy and later a resection for supposed rectal carcinoma before the tumour was shown to be of prostatic origin. In a fifth, resection of the right ileum was undertaken for a new growth which proved to be a metastasis from a cancerous prostate. The sixth and seventh suffered operative attacks on various metastatic lesions of the disease, while the last

complained of incontinence of faeces due to invasion of the sphincter ani by the tumour.

The later symptoms of cancer of the prostate do not differ greatly from the initial ones. Urinary symptoms and pain are the most important, nocturia, retention and hæmaturia leading the list.

EARLY DIAGNOSIS AND BIOPSY

It seems superfluous to state that earlier diagnosis is of prime importance, yet, with twenty-four months on the average elapsing between the onset of symptoms and the establishment of the diagnosis in the patients represented in this series, the point can stand vigorous emphasis. We have stressed previously the importance of routine examination of the prostate in all men over fifty years of age. We would now add that the persistent exhibition of frequency difficulty in urination, nocturia and retention in any patient of cancer age calls for a most careful and painstaking search for prostatic carcinoma. The difficulties of accurate diagnosis of prostatic neoplasms have been considerably decreased by the adoption of biopsy by needle puncture and aspiration according to the technique of Martin and Ellis and applied to the prostate by Ferguson.

In the series of cases here reported, 280 in number, there was histological confirmation of the clinical diagnosis by some form of biopsy or surgical specimen in 49. This represents 17.5 per cent of the total. Since the addition of biopsy by needle puncture and aspiration to our routine examination, except in those cases going to operation, we have secured histological evidence of our diagnosis in 14 of the 15 cases admitted. In 5 the specimen was obtained by Young's punch, while in 9 the tissue was secured by our new biopsy technique. In one case no attempt at biopsy was made. Moreover, biopsy by aspiration has enabled us to secure important information in several older cases. In one a recurrence after four years of apparent control was proven; in another previously regarded as chronic interstitial prostatitis a carcinoma was demonstrated. Among the more recent cases, this form of biopsy enabled us to make a diagnosis of cancer in two early cases previously regarded as benign. In another a rare prostatic tumour was diagnosed in advance, and later proven at operation, by means of this procedure. Ferguson's article (*Canad. M. Ass. J.*, 1933,

29: 497) illustrates some of the above-mentioned cases together with the amount and character of the tissues obtained by needle puncture and aspiration. If we are seeking earlier diagnoses of these tumours it must be recognized that carcinoma may and does originate in any portion of the organ, regardless of the presence or absence of benign hypertrophy, and that no false sense of security should be felt due to apparent normality of the posterior lobe.

TREATMENT BY RADIATION

A review of the use of radium and x-rays in carcinoma of the prostate at the Memorial Hospital reveals the difficult situation we are called upon to meet. An estimate of the status of 241 of the 280 cases here reported, made at the time of our first examination in each case, shows that 221 were classified as advanced cases, while only 20 could fairly be classed as early cases. Seventy-eight of the 221 represented post-operative recurrences.

In spite of the far-advanced type of case coming to our service we were able to report 5 of 46 cases alive and well after five years. These 46 patients constituted our first series and were treated between October, 1915, and January, 1917. In but one case was the neoplastic process confined to the prostate. No gross evidence of active cancer remained in the 5 patients surviving the five-year period, as far as we could see. These cases were treated by the insertion of steel radium-bearing needles through the perineum into the prostate and seminal vesicles. Small doses, 200 to 300 millicurie-hours for each needle, were utilized, repeating the dose every two to three months until the condition was controlled or no evidence of regression was found. In this way we were certainly able to control some cases, as we have the autopsy record of one patient in this group who died from other causes seven years after first seen. The original diagnosis by Doctor Ewing from the tissue was carcinoma of the prostate. At autopsy no carcinoma was to be found.

Since that first series progress has been slow but sure. Our therapeutic routine has had to be changed frequently, in order to avail ourselves of the advantages of newer methods and agents. Glass seeds of radon, low voltage and then high voltage x-rays, the radium element pack, radon filtered by platinum, and, now, gold seeds of radon have all been used alone and in

various combinations. We are gratified, however, that in spite of the necessity for the continual transition of radiation therapy, inspection of our file of current cases shows 8 of 40 patients alive and well for periods over five years. This means that 20 per cent of our active cases are still under control after five years, as compared with 10.8 per cent in our first reported series.

We believe that in most cases of prostatic carcinoma a much larger dose of radium than heretofore used is necessary to control the disease, in other words, doses comparable to those we have used in controlling bladder carcinoma. The results of radium implantation in bladder tumour have consistently improved and are considered by us to be quite superior to those from resection.

We believe that a tissue dose of about 10 skin-erythemas delivered to the tumour is necessary to control the large majority of prostatic carcinomata. The average adenocarcinoma is a radio-resistant tumour, but doses comparable to the above are sufficient for control in other locations and will undoubtedly prove so in cancer of the prostate. Since tissue dosage delivered to these tumours by external means alone, *i.e.*, high voltage x-rays and the radium element pack, can rarely exceed 1 to 1½ S. E. D., it

becomes essential to deliver the bulk of the total dose necessary by interstitial radiation. In each case the treatment must be determined according to the degree of involvement of each particular lobe. If the cancer is more or less confined to the posterior lobe, I prefer to use gold needles inserted into the prostate through the perineum and left in place, so that approximately 1000 millicurie-hours are delivered. Then the needles are removed.

If cystoscopy shows marked involvement of the median and lateral lobes then suprapubic approach and the insertion of gold seeds may be used to supplement the perineal needles. This is particularly applicable when urinary retention is present and it is necessary to cut away by cautery the obstructing lobe. The use of the resectoscope of Davis and McCarthy greatly facilitates the intra-urethral removal of such an obstruction and in many cases may eliminate the suprapubic operation. It is always wise to operate as little as possible upon these patients, the ideal being the elimination of any but minor operative procedures.

Persistent examinations at least every two months during the first year and continued irradiation of suspicious areas are supremely necessary if one wishes to control any appreciable number of cases.

STATUS LYMPHATICUS: AN ADRENAL-THYROID SYNDROME*

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STATUS lymphaticus, the subject of this paper, needs no introduction to a medical audience. We are all aware of the frequent occurrence among infants of a syndrome characterized by the onset of dyspnoea, or "choking spells," or laryngismus stridulus, accompanied by cyanosis or ashy pallor and collapse, with loss of consciousness. Often recovery is spontaneous; sometimes death ensues. Death often occurs while the baby is lying in its crib with no observed preliminary signs. The records of the Provincial Registrar in British Columbia show

that in the less-than-eight year period from January, 1925, to October, 1932, 47 such spontaneous fatalities in infants have been reported in Vancouver alone. They were confined to the white race, with the exception of 3 Chinese and 1 Japanese. In the great majority of these sudden deaths the diagnosis was confirmed by autopsy. The following case reports are illustrative of this tragic syndrome.

CASE 1

Baby H., a female, aged 7 months, was a full-term, apparently normal, child until March 22, 1931. On this date, at 3 p.m., she became "rather fretful and restless." No other abnormal signs were noted until her 1 a.m. feeding, when she seemed to breathe heavily.

* Read at a meeting of the Vancouver Medical Association on November 1, 1932.

At 3.30 a.m. she was restless and the mother noticed, while changing the diaper, a number of red "blotches" on the face, buttocks and legs. The child's general condition became so alarming in a short time that the parents took her directly to the Infants' Hospital. She was dead upon admission to the hospital at 5.45 a.m.

Autopsy report (Dr. H. H. Pitts).—"The body is that of a well nourished, well developed white female infant, 7 months of age. Little of note is apparent on external examination beyond the presence of scattered, rather indefinite, petechiæ on the face, trunk and limbs. The lungs are free in the pleural cavities; they are deeply congested but otherwise intact; they show scattered subpleural petechiæ. An extremely large thymus, weighing 38 gm. is present; this also shows subcapsular petechiæ. Two long prolongations extend upward into the neck anterior to the trachea. Scattered sub-epicardial petechiæ are also present; the heart itself is normal. Examination of the abdominal viscera shows no gross lesion or abnormality beyond the presence of a definite moderate hyperplasia of the mesenteric lymphatic glands. The spleen is not enlarged. The stomach contains some yellowish semi-mucoid fluid material. The brain reveals no evidence of meningitis, hæmorrhage or other disease. Both middle ears and mastoid antra were opened and were found to be absolutely clear. The nasopharynx on examination reveals no disease.

Diagnosis.—Status thymico-lymphaticus."

CASE 2

Baby P., a male, aged 4 months. At 6.45 p.m., on August 30, 1931, this infant was brought into the admitting room of the Infants' Hospital in a state of collapse. He was cyanosed and moaning constantly. His extremities were cold; his abdomen was soft. His temperature was 102.4°; his pulse poor. He was given caffein sodium benzoate, gr. ½, hypodermically, as well as oxygen inhalations, without improvement. Adrenalin, mm. 5, and a warm mustard bath were then tried with no improvement in the child's condition. Another hypodermic injection of adrenalin, mm. 5, was given and artificial respiration resorted to. There was not the slightest response to treatment and the child died one hour after arriving at the hospital.

There was nothing of significance in the previous history except an indefinite history of loose stools for the previous 24 hours. The child had been attending the clinic regularly, was gaining in weight, and making good progress until the onset of the loose stools on the previous day. Five other children were alive and well.

Autopsy report (Dr. H. H. Pitts).—"The body is that of a fairly well developed, but only fairly well nourished, white male infant of 4 months. There is nothing of particular note on external examination except that the anterior fontanelle is quite large, but not bulging. A rather large flattened thymus, extending well up into the subclavicular region, is found. It weighs 30 gm. It is not congested and shows no petechiæ. On section, definite purulent appearing material exudes from several areas. Direct smears of this material shows innumerable pus cells, but no organisms. The lungs are free in the pleural cavities and are grossly intact. The heart shows no gross lesion. The mediastinal glands are slightly enlarged. The abdominal viscera are in normal position and the only abnormality noted in the peritoneal cavity is the presence of numerous very much enlarged mesenteric glands. The skull cap was opened and a very oedematous brain was found. This was quite congested, but no exudate was present at the base and section revealed nothing of further note. Both middle

ears were opened and in the left a somewhat sanguineo-mucoid material was present. The right ear was clear. Nothing of further note was found.

"Diagnosis.—Status thymico-lymphaticus; possibly left otitis media."

CASE 3

V.McP., a female child, aged 19 months. Dr. G. E. Kidd was called by the father of this child on May 20, 1926. On his arrival Dr. Kidd found a dead infant and a very distressed father. The history given by the father was to the effect that the child had always been well previous to her sudden demise. At 11 p.m., while the father was giving the child her bottle, she had what he describes as a "choking spell" and became cyanosed and limp. He held her up by the legs and thumped her back. This measure failing to yield any improvement he performed artificial respiration, but with no beneficial effect.

Autopsy report (Dr. A. W. Hunter).—"This is a well nourished female child, stout in appearance. The abdominal cavity showed the lymph glands of the mesentery to be large. The chest examination showed a large thymus with hæmorrhagic spots in the anterior and posterior aspects. There are hæmorrhagic spots on the surface of the heart. The thymus gland extends up to the under surface of the thyroid gland. The thyroid is rather small, weighing 2.3 gm. The heart is negative. The lungs are negative except for petechial hæmorrhages on their surfaces. The examination of the head was negative.

"Diagnosis.—The appearance of this case suggests status lymphaticus."

CASE 4

Baby S., a female, 2 days old. Post-mortem examination by Dr. A. W. Hunter, showed a "well developed new-born female. In the peritoneal cavity was a slight amount of serum above the bladder. This may be caused by slight inflammation from the umbilical cord. The organs of the abdominal cavity appeared to be normal. On opening the pleural cavities the thymus gland appeared enlarged and was more to one side. It extended behind the sternum on the left side up to the thyroid gland and weighed 14.2 gm. The thyroid gland, while not large, appeared dark in colour, as if from venous congestion. The lungs and heart were negative. The head was not remarkable—the membranes and the brain itself being negative and showing no hæmorrhage.

"Diagnosis.—Status lymphaticus."

CASE 5

Baby A., a male aged 3 months. The following has been furnished by Dr. Carl Eaton: "On March 9, 1932, Dr. Eaton was called to the home of Mr. A. and found his little baby dead. The history is as follows: He was born in Sarnia, Ont., on November 29, 1931. He was breast-fed for two months and gained only slightly; he cried a good deal at night, presumably because of hunger. After arrival in Vancouver he was taken to the clinic for feeding instructions. The baby then thrived and stopped crying at night.

"On the evening of March 9th, the baby was given orange juice at 8.30 p.m. At 10.15 p.m. the child cried and refused milk but later went to sleep. At 11.15 p.m. it was found dead in its cot."

"Autopsy report.—Post-mortem examination, by Dr. Hunter, revealed the usual pathological findings of

status lymphaticus. In addition, Dr. Hunter states "the thymus gland is enlarged, weighing 33 grm., and from it, on section, escapes a milky material consisting of innumerable lymphocytes."

HISTORICAL OUTLINE

For over three hundred years the relationship of sudden death in children to thymic hyperplasia has engaged the attention of the medical profession. Following the first case of thymic enlargement reported by the Swiss physician, Felix Plater, in 1614, the association of sudden death with enlargement of the thymus gland in cases of laryngeal stridor, asthma and acute respiratory obstruction was more frequently reported, notably by Morgagni and Bichat. No attempt was made to bring the thymus into causal relationship with the clinical symptoms until 1830, when Kopp advanced the view that laryngospasm was a true "thymic asthma" due to pressure of an enlarged thymus on the trachea, great vessels or nerve trunks. The thymus thus became the central figure and Kopp's physical explanation was generally accepted until 1858, when Friedleben published his classical clinical and experimental studies on the thymus gland. He denied that pressure from an enlarged thymus could explain Kopp's "asthma thymicum", and briefly expressed his view in the dictum, "Es gibt kein Asthma thymicum". His conclusions were based upon a vast amount of experience, both with the clinical and pathological aspects of the condition as well as with experimental work in the physiology of the thymus. (Marine.)¹

After Friedleben's researches, apparently no other contributions were made to the subject until the time of Arnold Paltauf in 1889. He supported Friedleben's conclusions that the enlarged thymus was a secondary factor in thymic asthma. From a study of the vast amount of material available to him as coroner's physician in Vienna, he advanced the theory that "mors thymica" was due to a lowered resistance dependent upon a specific constitutional anomaly of a lymphatico-chlorotic type, which so weakened the influence of the nervous system that persons so affected were unable to withstand shocks or injuries which would not have seriously affected normal persons. The anatomical changes observed were only to be regarded as the gross mani-

festations of the nutritional defect, which Paltauf named *status lymphaticus*.

In more recent times, the best outline of the history and pathology of *status lymphaticus* has been made by D. Marine. In his review of the subject¹ he states, "It is of secondary importance whether the thymus is large or small, since the thymic change indicates only the stage or degree of the individual's lymphoid reaction at the time. If it is assumed that *status lymphaticus* is a nutritional defect or a deficiency disease tending toward spontaneous recovery and manifesting itself at different ages, it follows that there are all degrees of *status lymphaticus*, mild and severe, and all stages, progressive and regressive. With such a conception, it is readily understandable that a constant morbid anatomy cannot be present any more than the thyroid changes could be constant in all stages of goitre. If one allows for range, the stage and the age of the child, it is not to be doubted that a striking similarity of lesions is found in a significant number of persons who die more or less suddenly from apparently trivial causes."

THE SIGNS AND SYMPTOMS OF STATUS LYMPHATICUS

It is apparent that there is often a total absence of any indication that an infant is afflicted with this tragic syndrome until death has occurred. However, there are degrees of *status lymphaticus*. More common than the fatalities from *status lymphaticus* are the cases of mild *status lymphaticus* which show the so-called "thymic" symptoms. These are air-hunger, often accompanied by croupy respiration and cyanosis, and, frequently, collapse. The attacks are often preceded by fits of crying and temper, and the child appearing to hold its breath. In reality it is showing air-hunger and laryngospasm probably due to a severe upset in the body chemistry. Sometimes some immediate cause for the attack is noted, such as fatigue, fright, exposure to cold or a temper tantrum.

In addition to these immediate precedents of the attacks, there are few known indications that a child is a case of *status lymphaticus*. Dr. J. A. MacLachlan, of Vancouver, has noted that these babies are more or less inert; also, that

preceding an attack there is a disinclination on the infant's part to take its feeding. Dr. Kohlbry⁵, of Minnesota, states that these infants are particularly likely to contract infection. This observation is a sound one, and it is probably true that many infants affected with this masked syndrome of status lymphaticus die from comparatively mild respiratory and other infections. In appearance, these infants are usually well nourished, but pale and often apathetic.

A SUGGESTED THEORY

In this paper an effort will be made to show that there exists a remarkable correlation between the thymus, thyroid and adrenal glands; that status lymphaticus is in essence a dysfunction of the adrenal cortex which is more likely to occur in the presence of thyroid dysfunction due to a relative lack of iodine; and that enlargement of the thymus is secondary to thyroid-adrenal dysfunction.

THE THYMUS GLAND IN STATUS LYMPHATICUS

It is impossible to discuss status lymphaticus without considering the significance of thymic hyperplasia. As has been indicated above, there are still two schools of opinion in regard to the part played by the thymus in status lymphaticus; one, the school of Kopp and his modern exponents, Drs. Chevalier Jackson and Pancoast, who believe that the symptomatology and death in status lymphaticus are due to the mechanical pressure of a large thymus upon the trachea and large veins of the neck; the other that of Friedleben, Paltauf, Symmers and Marine, who believe that the enlargement of the thymus is rather a concomitant anatomical expression of a constitutional deficiency, which they call status lymphaticus. I wish to suggest that this constitutional deficiency is essentially an adrenal-thyroid dysfunction, augmented, or even caused, by a relative lack of iodine in the infant's or mother's dietary; that the symptoms and death in these infants are due to a failure of the function of the vital adrenal cortex.

The subject of the thymus gland cannot be dismissed without a few words regarding thymic weights. As far as Vancouver is concerned, the true normal thymic weight is unknown. Such a

true normal thymic weight can only be arrived at by the autopsy of children meeting sudden traumatic deaths, in whom careful examination of the mesenteric lymphatic glands permits the exclusion of status lymphaticus. This sound method of clinical research, followed by Anderson and Cameron², of Glasgow, showed that, in Glasgow at least, the normal thymus never exceeds fifteen grams in weight. A fact that is usually not considered in the morbid consideration of the thymus is that, as shown by Marine, the thymus is the most labile tissue in the body and may shrink to one-fifth of its previous weight within one week. Starvation and its clinical corollary, malnutrition, and acute and chronic infections cause rapid involution of the organ. It follows, therefore, that the so-called "normal" thymus is only to be found in healthy children, and here again its size varies from time to time, depending upon the nutrition of the child.

The undoubtedly beneficial effect that usually follows x-ray treatment of the thymus gland is considered by some observers as proof of the culpability of the thymus in regard to status lymphaticus. The thymus undergoes varying degrees of involution following x-ray treatment. Dr. W. Whitelaw has stated³ that sometimes marked clinical improvement occurs without any appreciable diminution in the size of the thymus gland. It is not impossible that the benefits of x-ray in the thymus area in status lymphaticus are analogous to those obtained by Walderott⁴ in the treatment of asthma by the application of x-ray emanations to the spleen. Both spleen and thymus are essentially lymphoid organs.

THE ADRENAL CORTEX

Recent animal experimentation has demonstrated the now unassailable fact that *it is the cortex that is the vital part of the adrenal gland*. Animals invariably die following bilateral adrenalectomy unless a small portion (not less than one-eighth) of the adrenal cortex is left intact, or unless the animal is supplied, by mouth or subcutaneously, with a potent extract of beef or other adrenal cortex. The effects of total loss of this vital cortico-adrenal function is well illustrated by the 1926 report of Banting and Gearn⁶ concerning their experimental results in dogs following a two-stage bilateral adrenalectomy.

The autopsy findings in dogs dying from cortico-adrenal insufficiency are constant and informative. They are: (1) an enlarged thymus gland; (2) marked enlargement of the mediastinal and mesenteric lymphatic glands; (3) degeneration and actual necrosis of the liver; (4) congestion and ulceration of the stomach and duodenum.

Banting and Gearns, further, showed that a concentrated meat diet precipitated the onset of the terminal symptoms; that small injections of histamine caused almost immediate death in these animals; and that the infusion of hypertonic saline (5 per cent) revived the dogs and relieved symptoms as long as the kidneys continued to function.

Partial cortico-adrenal insufficiency.—The effect of a partial cortico-adrenal insufficiency in dogs was first demonstrated by the admirable work of Wisloki and Crowe,⁷ of Baltimore, in 1914.

By an ingenious operative procedure they destroyed all but a small portion of the adrenal cortical tissue in dogs, leaving the medulla intact. The operation was performed in four stages. After each operation convulsive seizures, drowsiness that was almost coma, and a scanty secretion of urine were prominent and almost fatal symptoms, these being the recognized symptoms of an adrenal cortical insufficiency. Several dogs were experimented upon. One animal was accidentally killed 4½ months after the establishment of the cortico-adrenal insufficiency; in this period, growth, development and sexual functions had been apparently normal. The autopsy revealed:— (1) a large thymus; (2) enlarged mesenteric and mediastinal lymph glands; (3) enlargement of Peyer's patches in the intestine; (4) hypertrophied tonsils (very unusual in the dog).

CORTICO-ADRENAL—THYMUS GLAND RELATIONS

The experimental work of Banting and Gearns and many other physiologists in complete adrenalectomy experiments in animals, and the work of Wisloki and Crowe in the field of animal partial adrenalectomy, show that there exists a striking relationship between the adrenal cortex and the thymus gland. When the adrenal cortex is absent or incomplete, enlargement of the thymus gland is found; conversely, it has been shown by other workers, that during starvation, when hypertrophy of the adrenal cortex always occurs, there is involution of the thymus gland. The work of Marine, Manley and Baumann⁸ with rabbits (using 373 protocols) is confirmatory of this adrenal cortex-thymus gland relationship.

CORTICO-ADRENAL FUNCTION AND RESISTANCE TO TOXINS

Lewis⁹ has shown that surviving adrenalectomized albino rats are from five to seven times as susceptible to toxins such as histamine, diphtheria toxin, etc. as are the normal controls. Dr. J. G. FitzGerald,¹⁰ of Toronto, states that

unless there is very marked congestion of the adrenals of test guinea pigs after the injection of diphtheria toxin some cause other than diphtheria toxin has been responsible for death. Bernard and Bigart¹¹ poisoned rats with arsenic, mercury, copper, zinc, iodine and lead and found at autopsy hæmorrhage and necrosis in the adrenal cortex. With small repeated doses they found hypertrophy of the cortex.

CORTICO-ADRENAL FUNCTION AND RESISTANCE TO COLD

Hartman, Brownell and Crosby³⁰, have shown that:—

(1) While normal rats show a fall in body temperature of little more than one degree centigrade when exposed to cold (4 to 18° C.), adrenalectomized rats show a fall of twelve degrees or more and often die. If the adrenalectomized rats are injected with "cortin" (a potent extract of beef adrenal cortex), they only show a drop of two or three degrees when exposed to the same low temperature. Injections of adrenalin afforded no protection to adrenalectomized rats when exposed to cold. (2) There is an increase in weight of the adrenals of normal rats that have been exposed to cold for twenty hours. Dr. Hartman¹² has stated that this increase is entirely in the cortex and amounts to 10 per cent of the whole gland. (3) Metabolism of rats is lowered 10 to 20 per cent by adrenalectomy, but returns to normal when an adequate supply of "cortin" is injected. The fall in temperature is due to a decrease in heat production. The administration of the cortical extract enables such animals to produce heat almost as well as normals.

CORTICO-ADRENAL FUNCTION AND SURGICAL INTERFERENCE

Dr. F. A. Hartman, of Buffalo, has had a very wide experience with cortico-adrenal physiology. His remarks in connection with cortical insufficiency and operation are of interest:—

"Adrenalectomized animals (treated with cortin), although apparently in excellent condition, do not seem to be good operative risks. A cat which appeared to be in good condition (being treated with cortin) eleven days after complete adrenalectomy was carefully anesthetized with ether and the kidney exposed extraperitoneally. It died as soon as the kidney was touched. This would be rare for a normal cat."

CORTICO-ADRENAL INSUFFICIENCY IN MAN

That the presence of an adequate cortico-adrenal function is vital for man as well as for laboratory animals is demonstrated by two well authenticated clinical types of adrenal cortex dysfunction: (1) sudden bilateral hæmorrhage into the adrenals, and (2) the atrophic or tuberculous destruction of the cortex, as manifested in Addison's disease. In the former, the clinical signs are, as so well described by M. A. Rabino-witz,¹³ abdominal pain and crying; vomiting and

diarrhoea; convulsions; fever; rapid pulse; cyanosis and dyspnoea; purpura; coma; subnormal temperature and death in six to forty-eight hours from the onset. The symptoms of Addison's disease, asthenia and gastro-intestinal disturbances, are well known. One of the early clinical signs is an aversion to fatty foods. The signs and symptoms of a patient in a crisis of Addison's disease are similar to those described in adrenalectomized animals. The autopsy findings in young adults dying from Addison's disease are also similar to those found in adrenalectomized dogs and children dying from status lymphaticus, *viz.*, enlarged lymphatic glands and enlarged thymus gland. The crisis in Addison's disease may be precipitated by infection or fatigue.¹⁴ Sudden death in Addison's disease is not rare.¹⁵

In addition to the two clinical entities above mentioned, associated with cortico-adrenal dysfunction, I would suggest that there exists a third in the form of status lymphaticus. The question immediately arises, "How is adrenal cortex insufficiency incurred in infancy?" The answer lies in the following quotation from Prof. Boyd, of Winnipeg¹⁶:—

"The development of the adrenal, both before and after birth, is of singular interest. In intra-uterine life, the gland consists almost entirely of cortex, and this cortical development is so great that at the third month of fetal life the adrenal is actually larger than the kidney, reaching at this period its greatest relative size. However, this cortex is not the cortex of the adult adrenal. The fetal cortex is composed of large eosinophilic cells arranged in sheets rather than columns and containing no lipid. At birth a thin layer of the characteristic clear cortical cells of the adult type occupies the position of the zona glomerulosa. These cells stain intensely with lipid stain, whereas the cells of the fetal cortex remain unstained. There is also a very thin core of medulla. At birth the adrenal is still a relatively large organ compared with the kidney.

"Immediately after birth an extraordinary change occurs. The entire fetal cortex degenerates, and the debris is replaced by a loose connective tissue. At the same time, the adult cortex and the medulla begin to increase in size and to encroach on the degenerating fetal cortex. It is not until the twelfth year that the original weight at birth is fully regained. The process of degeneration at birth may be complicated by extensive hæmorrhage into the central part of the gland, a condition known as massive hæmorrhage of the new born and often wrongly interpreted as hæmorrhage into the medulla."

The above authoritative description of the fetal and infantile changes in the adrenal cortex clearly indicates how, from hæmorrhage or retarded regeneration of the permanent adult type of cortex, an infant might readily be in a state of temporary cortico-adrenal insufficiency. It is significant that the vast majority of sudden deaths in infants occur during the first year of

life, coincident with the time of degeneration of the fetal cortex and regeneration of the adult cortex, admittedly an unstable period in the physiology of the adrenal cortex.

The function of the adrenal cortex.—Physiological experimentation and clinical experience indicate that the principal function of the adrenal cortex is to secrete a hormone or hormones that are in the nature of catalysts whose presence is essential to normal hepatic, pancreatic, gastric, and renal functions. Recently, Szent-Györgi has isolated from the adrenal cortex a catalyst which he named hexuronic acid¹⁷, and which E. C. Kendall¹⁸ describes as one of the most active biological reducing agents known. Experimental research shows that the adrenal cortex plays an essential part in both exogenous and endogenous detoxification, in combating infection, and in maintaining body temperature.

THE THYROID-THYMUS RELATIONSHIP

In addition to experimental and clinical cortico-adrenal insufficiency there is one other common clinical condition in which hypertrophy of the thymus occurs, *viz.*, Graves' disease. It has been affirmed by Marine that in this disease the thymus is enlarged in seventy-five per cent of adults under thirty years of age. These facts suggest that dysfunction of either (possibly both) the thyroid or adrenal cortex may cause thymic hyperplasia in young persons, and they further suggest that the adrenal cortex, thyroid gland and thymus gland are interrelated in physiological function. It is no great surprise, therefore, to learn that, in addition to their close developmental relationship, a close anatomical connection exists between the thyroid and thymus glands. This was first described by Sir Astley Cooper in 1832. Attention has been redirected to it by Burne¹⁹ and by Williamson and Pearse²⁰. These observers have demonstrated that, in addition to its general lymphatic connections, the thyroid is connected with the thymus by a thyro-thymic lymph system which is phylogenetically related to the thyro-gill lymph system seen in fishes. In accord with this anatomical thyro-thymic-lymphatic connection, Williamson and Pearse²¹ have postulated two secretions of the thyroid gland: (1) *iodo-colloid*, containing thyroxin which is absorbed directly into the blood stream; (2) "*lymphogenic*" secretion—a parenchymatous product of the thyroid which is stored in the thymus, where it is detoxicated.

THE THYROID GLAND

Although much has been written concerning the thyroid gland, as yet we have very little factual knowledge as to its real place in animal physiology. It is commonly taught that the function of the thyroid gland lies solely in the production of thyroxin from the toxic amine, tyrosine. Thyroxin occurs in such small quantities in the thyroid that Kendall, in his notable investigation of the thyroid secretion, used three and one-half tons of pigs' thyroids to secure thirty grams of thyroxin²². If the secretion of thyroxin is the sole function of the thyroid, Nature, in providing a gland twenty to fifty times the size of the pituitary, with a blood flow five times that of the kidney, has been unusually lavish. Furthermore, it is known that a mere 14 milligrams of thyroxin is to be found in the average adult human being, exclusive of the thyroid gland itself, and this moiety of thyroxin is capable of use for five to six weeks before it is eliminated or destroyed. The pituitary gland, in contradistinction to the thyroid, is known to produce at least six important autacoids or hormones.

Thyroxin, a derivative of tyrosine, contains sixty-five per cent iodine. Incorporated in the thyroxin molecule is the carboxyl group, (COOH). E. C. Kendall²³ has shown that the better known katabolic action of thyroxin in promoting tissue oxidation is dependent upon the presence of the carboxyl group, while the equally important, but often forgotten, anabolic or tissue building catalytic function of thyroxin is directly dependent upon the presence of iodine in the molecule. This point is of great importance in any consideration of thyroid physiology or pathology. Kendall has recently shown that ninety per cent of the iodine present in the thyroid gland is there in some form other than thyroxin. These findings are in accord with the teaching of Marine who has for years emphasized the importance of an adequate supply of iodine if the thyroid gland is to function normally and without hyperplasia or goitre.

Lack of time prevents the full discussion of thyroid physiology that its importance warrants. For our purposes here, it is sufficient to note briefly some, at least, of the common causes of "thyroid strain" as evidenced by the production of simple goitre when these factors are operative. McCarrison²⁴ aptly likens iodine to a lubricant which, by its ample presence, enables even an overworked thyroid to function smoothly. The factors that have been shown to be productive

of "thyroid strain" are: (1) Unsanitary conditions of living; (2) an ill-balanced diet: (a) excess of protein; (b) excess of fats; (c) excess of calcium; (d) lack of vitamins; (3) physiological epochs.

It is to be noted that the above factors, when operating alone or in combination, can produce, especially where there is an iodine deficiency, that well-known sign of "thyroid strain"—the simple goitre. It is to be further noted that a marked condition of thyroid dysfunction is compatible with a small thyroid as exemplified by the lymphadenoid goitre of Williamson and Pearse.

Dr. W. D. Keith,²⁵ of Vancouver, has informed us concerning a certain factor which produced goitre in 80 per cent of the white people and the cattle living in the Pemberton Valley, ninety miles north-east of this city. Only the Indians and their pigs were free from goitre. As Dr. Keith described it, the "thyroid strain" fell heaviest upon the new-born calves, pigs and foals. These young animals would generally die shortly after birth if the latter event took place in the Spring. Acting on the advice of Dr. Marine, iodine was administered in small quantities to the pregnant stock and they henceforth continued to give birth to normal offspring which lived. It is of considerable significance that a mild degree of the above signs of thyroid dysfunction in farm stock is endemic on Lulu Island, the farming community adjoining Vancouver.

In 1925-26, Drs. C. H. Vrooman, H. H. Hill and A. S. Lamb²⁶ conducted a goitre survey of the Indians living in villages on the sea-coast of British Columbia. In all, 485 natives were examined and no trace of simple or other form of goitre was found, except in one young woman who had spent some years in attendance at the Indian school at Sardis, B.C., seventy miles inland from Vancouver. The food of the British Columbia coast Indian is largely derived from the sea. In correlation with these data concerning the immunity of the coast Indian to goitre, I would direct your attention to a statement that has been made by Dr. Geo. Darby,²⁷ physician-in-charge of these Indians. Dr. Darby states that in ten years' practice among the coast Indians he has yet to see a case of sudden death in an Indian baby that resembles in any way the status lymphaticus with which our white infants are afflicted.

A very recent analysis of the milk supplied to Vancouver people by the largest milk distributing association in the city shows absolutely no trace of iodine.²⁸ As cows' milk is the principal *sine qua non* of many Vancouver infants' dietary, the significance of this iodine lack is considerable. In cows' milk that contains no trace of iodine but which is rich in fat and calcium it is quite reasonable to assume there lies a potent causal factor for what we are pleased to call "thyroid strain". It will be recalled in this connection that status lymphaticus is comparatively rare in a breast-fed infant. It will also be noted that a check-up on the incidents preceding the death of the infant shows a remarkable relationship to a feeding of modified or whole cows' milk. Infants

that died were often found dead in their cribs shortly after a bottle feeding. I would suggest that in this chemically unbalanced milk lies the predisposing cause of status lymphaticus.

DISCUSSION

Status lymphaticus in children and operative partial cortico-adrenal insufficiency in animals have many features in common. Lowered resistance to cold, infection, operation, and foreign protein is characteristic of both conditions. In either of them the victim, whether child or animal, is essentially an unstable individual. His hold on life is very precarious and may be completely loosened by simple factors, such as a mild infection or even a well-conducted anaesthesia. In experimental animals and in infants dying from acute hæmorrhage into the adrenals the terminal symptoms are similar. Purpura, a sign common to both conditions, was noted in Case 1 of our series. Diarrhœa, a common symptom of cortico-adrenal insufficiency in animals, was present in Case 2. This case also illustrates the hopelessness of our present methods of supportive treatment. If the theory herein presented proves to be in accord with the actual basis of the dysfunction in these children, the intravenous infusion of normal saline and a potent cortico-adrenal extract will be a life-saving measure. The pathological report in Case 4 shows that the thyroid gland "while not large, appeared dark in colour, as if from venous congestion." This finding would probably be more frequently duplicated if the thyroid gland were examined more often and more minutely in post-mortem examination of status lymphaticus cases. The engorgement of the thyroid and the "well nourished" appearance were characteristic findings in the new-born calves, pigs and foals dying shortly after birth in the Pemberton Valley before the institution of iodine therapy.

That toxæmia exists in children afflicted with status lymphaticus is indicated by the frequency of the occurrence of fatty degeneration of the arteries of all sizes reported by Anderson and Cameron in 50 per cent of their large series of cases. MacLean and Sullivan²⁹ report fatty degeneration of the liver in each of their 3 cases. Several of the more detailed reports submitted to the British Status Lymphaticus Committee record degenerative changes in the liver in cases of sudden death in children. Arterial and liver disease would probably be more frequently reported if more detailed search were made in cases of status lymphaticus. The lymphoblastic

hyperplasia characteristic of all status lymphaticus cases is due to this underlying toxæmia. The toxins in circulation are incomplete products of metabolism—the so-called "toxic metabolites". Their existence is due to an insufficiency of the reducing catalyst from the adrenal cortex—hexuronic acid—as well as to a paucity of the well-known oxidizing catalyst from the thyroid gland—thyroxin. Both these catalysts are necessary for normal hepatic function. Degeneration and necrosis of the liver were found in every adrenalectomized dog in the series of Banting and Gearn. Fatty degeneration of the liver occurs in Addison's disease, in thyroid dysfunction, and in status lymphaticus.

The laryngospasm often noted in the "attacks" to which children with status lymphaticus are subject has lead to the prevailing confusion of thought regarding the true rôle of the thymus gland in these infants. "Thymic asthma," supposedly due to the pressure of the thymus gland upon the trachea, is more reasonably regarded as laryngospasm. In the tetany that sometimes accompanies status lymphaticus and other disturbances of body chemistry the stronger flexor and adductor muscles overpower the extensors and abductors, and the characteristic picture of carpo-pedal spasm is presented. Similarly in the larynx, the stronger adductors overpower the abductors and a condition of laryngospasm, with its inevitable accompaniment, laryngismus stridulus, occurs. It is doubtful whether the laryngospasm is the sole cause of the cyanosis that often accompanies an attack. It is more likely that the infant's blood, owing to the overwhelming metabolic toxæmia, will no longer carry oxygen to the tissues. It becomes dark and anhydramic, as does that of the adrenalectomized dog.

In accord with the theory of the etiology of status lymphaticus advanced here, death may be ascribed to the condition of blood dehydration or anhydramia that is inevitable in all types of severe upsets in body chemistry, such as follow adrenalectomy, hepatectomy, pancreatectomy, hypophysectomy, over-dosage with parathormone or irradiated ergosterol. The loss of function of any important endocrine gland is inevitably followed by a severe upset in body chemistry which inevitably results in blood dehydration and death with similar symptoms of exitus.

SUGGESTED TREATMENT

In accordance with the above-described theory of the etiology of status lymphaticus, and as

proof or refutation of the same, the following is suggested.

(a) Prophylactic treatment should ensure an adequate supply of iodine to the mother during pregnancy and lactation and to the bottle-fed infant.

(b) Actual treatment may be considered as emergency or as symptomatic. The former has been well supplied in the past by the application of the x-ray to the thymus gland. No change in this form of treatment would be justified until newer and different methods have proved their worth in the milder cases. The experimental use of suprarenal cortex, thyroid extract or iodine is suggested.

CONCLUSIONS

1. Status lymphaticus is a real pathological entity, most common in infants under one year.

2. Status lymphaticus implies lowered resistance to infection, physical shock, foreign protein and operation.

3. These features of lowered resistance can be duplicated in animals by the operative production of a partial cortico-adrenal insufficiency.

4. The autopsy findings in status lymphaticus and experimental cortico-adrenal insufficiency are

identical, and are essentially those of lymphoblastic proliferation.

5. There is ample opportunity for a temporary cortico-adrenal insufficiency to occur in any infant, owing to the developmental processes peculiar to the adrenal cortex.

6. Thyroid dysfunction, from a high fat, high calcium and low iodine diet (cows' milk), is regarded as the predisposing cause of the cortico-adrenal insufficiency which is status lymphaticus.

7. The prophylactic ingestion of iodine by mother and infant is suggested as a preventive measure.

8. Potent cortico-adrenal and thyroid extracts, in the form of opotherapy, are suggested in the actual treatment.

REFERENCES

1. MARINE, *Arch. of Path.*, 1928, 5: 661.
6. BANTING AND GEARNS, *Am. J. Physiol.*, 1926, 77: 100.
7. WISLOKI AND CROWE, *Johns Hopkins Hosp. Bull.*, 1914, 25: 287.
8. MARINE, MANLEY AND BAUMANN, *J. Exp. Med.*, 1924, 40: 429.
13. RABINOWITZ, *Am. J. M. Sc.*, 1923, 166: 513.
16. BOYD, *The Pathology of Internal Diseases*, Lea & Febiger, Phila., 1931, p. 469.
18. KENDALL, *Endocrinology*, 1931, 15: 357.
19. Quoted by CRUICKSHANK, *Canad. M. Ass. J.*, 1932, 26: 647.
20. WILLIAMSON AND PEARSE, *Brit. J. Surg.*, 1926, 13: 51.
22. MACLEOD, *Physiology and Biochemistry in Modern Medicine*, C. V. Mosby, St. Louis, 1930, p. 1005.
24. MCCARRISON, *The Simple Goitres*, Baillière, Tindall & Cox, London, 1928.

The complete list of references may be obtained from the author.

PRESENT CONCEPTIONS OF RENAL TUBERCULOSIS*

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DURING recent years there has been a changing attitude in our interpretation of the life-history of tuberculous renal infections. The early teachings of the urologist definitely stated that a tuberculous renal infection does not heal but progresses gradually to complete destruction of the organ; also, that the infection is hæmatogenous in origin, being carried to the kidney by the blood stream from some other focus in the body. A focus, once started in the kidney parenchyma, progresses until it forms a cavity which ruptures into the pelvis and discharges pus and tubercle bacilli into the urine. Clinicians had not noted the healing of these cavities, nor had pathologists seen any area in the kidney

which could be called a healed tubercle or a healed cavity. The only healed lesion recognized was the autonephrectomy where the disease progressed to the point of complete destruction of the kidney with the deposit of some calcified material in the inspissated pus.

Now, workers in the field of tuberculosis and urinary infections have altered our views. Medlar,¹ working on kidneys from patients who had died of pulmonary tuberculosis, has demonstrated that multiple small and microscopic lesions have healed and left scars. These scars have a definite distribution in the zones of the kidneys which exactly correspond to proven tuberculous foci in the kidney. They are older tuberculous infections than the active lesions seen. Early lesions of tuberculosis in other tissues are known to heal, and it is reasonable

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to suppose that they should heal in such a vascular structure as the kidney.

Before proceeding to the discussion of the pathological anatomy of tuberculous nephritis, let us consider the question of "excretory bacilluria." Last winter Dr. M. H. Book,² working in the Banting Institute, was studying the problem of the excretion from the kidney of colon bacilli, *S. aureus* and *B. prodigiosus*. These microorganisms were injected in large numbers intravenously into rabbits. The *B. coli* and *B. prodigiosus* did not appear in the urine in twenty-four hours. A few staphylococci came through in 12 hours and more in 24 hours. This was considered sufficient time for the formation of renal abscesses which could rupture into a tubule and thus pour out the results of the breaking-down of minute abscesses. The rabbits were killed at intervals from 10 minutes up to 48 hours after the injection of the organisms and the kidney incubated before fixation. Serial sections of the incubated kidneys were made in an effort to localize the organisms in the kidney parenchyma. Colonies formed from the organisms conformed to the shape of the containing vessel, that is, if they were in a capillary tuft, such as the glomerulus, they took the form of the capillaries of the tuft. If they had gone beyond they were in the space around the tubules, present in the blood vessels or lymph spaces. A few of the later colonies found were in the tubules. From this work Book concluded that bacteria do not reach the lumen of the tubules within the first few hours after the injection. It is unlikely that they reach the tubules until damage is done to the walls of the arterioles or tubular walls. Apparently the capillary walls are very resistant to the passage of organisms through to the surrounding tissue.

If one encounters a bilateral staphylococcus infection in the kidneys it is common to see more abscesses in one kidney than another. Similarly, if tubercle bacilli float in the blood stream they are distributed unevenly to both kidneys. Tuberculous nephritis develops slowly, while staphylococcus infections develop rapidly. By the uneven development of the tuberculous infections one may get the impression of a unilateral infection, even though both kidneys are affected and one much slower to develop than the other.

Medlar³ investigated the question of excretory bacilluria by two intravenous injections of

tubercle bacilli into guinea pigs, ten days apart. He used 73 guinea pigs and examined 24-hour specimens of urine for 21 days. These specimens were all examined for tubercle bacilli and guinea pigs were injected. They were all negative. This showed that not one of the millions of tubercle bacilli injected intravenously was recovered in the total volume of the urine collected over a period of 21 days. They were not demonstrated to have been excreted in the urine.

Another series of 9 guinea pigs in the end-stages of generalized tuberculosis was studied by Medlar. Seven had renal tuberculosis; 5 had gross tuberculosis; 2, microscopic, which was only discovered with serial sections. Two did not have renal tuberculosis. Of the 7 with renal tuberculosis, 5 were excreting tubercle bacilli, while 2 were not. One of the microscopic lesions was at the tip of a pyramid, and if it were not for the serial sections it might have been called wrongly an "excretory bacilluria." From these observations he concluded that tubercle bacilli were present in urine only when a lesion was present; in other words, excretory bacilluria was not demonstrated. Another investigation of Medlar's took in the examination of 44 kidneys in 30 autopsies from patients dying from generalized tuberculosis. One hundred thousand sections were studied. In 22 of the cases there was renal tuberculosis. Fourteen had scars as well as definite tuberculous lesions, while 5 had scars only. These scars appeared to be of different ages. The location of the scars was as follows:— 80 per cent cortical; 14 per cent medullary; 6 per cent cortico-medullary. The location of the tuberculous lesions was:— 75 per cent cortical; 11 per cent medullary; 13 per cent cortico-medullary.

He does not state emphatically that these scars were tuberculous and the evidence of a healed tuberculous lesion. Tuberculous areas of different ages were present and the scars were present in kidneys which had tuberculous areas. *The scars were distributed throughout the kidney substance in approximately the same ratio as the proven tuberculous lesions.*

A small focus may heal, but a larger focus progresses and produces caseo-cavernous tuberculosis, as one sees in the patient presenting symptoms. The early tubercles which do not progress and heal will be present without being demonstrable clinically. One can diagnose renal

tuberculosis when the organism is found in the urine or a cavity found with a pyelogram.

THE LESIONS AND THEIR PROGRESS

Let us study the lesions formed by a tubercle bacillus or an embolus of bacilli lodged in a glomerular tuft. The irritation of the organisms attracts lymphocytes and a tubercle is formed. If the tubercle bacilli are avirulent or if the individual has a good resistance the cells win the fight against the invading organisms and a healed area results. If, on the other hand, the organisms are virulent for that individual and gain the upper hand the fight between the protecting cells and the organisms becomes fiercer, and stronger combatants in the form of neutrophils take the place of the destroyed lymphocytes. Thus a microscopical tuberculous abscess is formed. These abscesses may be located in the glomerulus or between the tubules. One of these abscesses caseates, tubercles form in its walls and coalesce with the original abscess cavity. This may so increase in size that it eventually ruptures into the kidney pelvis and discharges pus and tubercle bacilli into the urinary stream. A microscopic tuberculous abscess may rupture into a tubule and the contents of the abscess be discharged into the urine. This may be the only focus in the kidney. A cavity may be formed by a group of tubercles enlarging and coalescing to form one large caseating area. In some instances these areas of caseation remain in the kidney parenchyma without any communication with the pelvis. Their progress may be stopped completely and an x-ray may outline a light shadow out in the kidney parenchyma which might be diagnosed quite easily as a renal calculus, but that it is present in the parenchyma and not in the pelvis or calyces.

Have we observed a proven case of renal tuberculosis to heal and remain healed?

CASE REPORT

A female patient, aged 17 years, was seen first in 1923 suffering from a pleurisy. Early in 1926 two separate cystoscopies proved bilateral renal tuberculosis. In 1928, after two years of rest and treatment with bacillus emulsion, she presented herself for examination. Cystoscopy, ureteral catheterization, pyelogram and guinea pigs, all showed no evidence of any infection and there were no urinary symptoms. Four months later the same examination was carried out with completely negative results.

She was seen every few months and no pus or tubercle bacilli were present in the urine. Hæmaturia occurred in February, 1932, and examination showed pus and a positive guinea-pig test was obtained from

the right kidney and bladder, while the left kidney was clear. In May, 1932, the bladder was positive, while the kidneys were both negative. In September, 1932, the bladder urine was positive again but the ureters were not catheterized. Her symptoms are improving again.

This patient was discussed with Professor Wildbolz during his visit here in 1929, when she was apparently healed. We had felt that she had cleared completely and would not likely relapse. His comment was that he had followed one patient like this for nine years, when the condition recurred and he felt that it would return in this patient. She went through a period when all evidence of a renal tuberculosis had disappeared. That is, the areas in both kidneys which were pouring out pus cells and tubercle bacilli had ceased to discharge and the cystitis had disappeared. Also the tuberculous inflammation in the bladder disappeared. Then there was a recurrence as a unilateral involvement of the right kidney and bladder. Some authors have claimed completely healed clinical cases of renal tuberculosis, but the above patient is the nearest approach to an instance of a healed renal tuberculosis observed in our clinic.

Strictures in the urethra may occur during the course of a renal tuberculosis. They are seen most often in young adult males, are much harder than the ordinary inflammatory strictures, and must be treated by dilatation.

AGE INCIDENCE

In our series of 83 cases the age-incidence was as follows.

TABLE I

Age	No. of cases	Percentages
10 to 19	8	10
20 to 29	26	31
30 to 39	26	31
40 to 49	18	22
50 to 59	4	5
60 to 69	1	1
	<u>83</u>	<u>100</u>

N.B. The percentage is calculated to the nearest unit.

From Table I, one sees that the age of renal tuberculosis in this series is the same as the age of pulmonary and bone tuberculosis. In the decades from 20 to 50 years one has 84 per cent of the total number under treatment. Harris reported 4 cases, or 8.8 per cent, of renal tuberculosis in children in a series of 45 patients, all under 14 years of age. One patient was as young as five months. Thus one may conclude that renal tuberculosis may be present

at any age, but more particularly in the middle decades of life.

THE CLINICAL COURSE OF RENAL TUBERCULOSIS

Early renal tuberculosis may be present and not produce any symptoms. The closed lesion may be microscopic in size or multiple large cavities which have not ruptured into the pelvis, and it may be impossible to diagnose the disease until the pus is being discharged in the urine. Pus and tubercle bacilli may be thrown into the urine by the rupture of a tuberculous abscess. This leaves a caseo-cavernous area in the kidney with active tubercles in its wall which steadily encroach on the kidney substance. The infective agent may be present in the urine for months and sometimes for years without producing any urinary symptoms. Eventually, the bladder mucosa becomes involved and frequency, pain and hæmaturia come on. These are gradual in their onset and increase in severity. The ureter becomes thickened like a pipe-stem, with numerous strictures along its course. In female patients it may be felt in the lateral fornix of the vagina.

The bladder mucosa may show typical tubercles in the region of the ureteral orifices which later will coalesce and ulcerate. The inflammation causes a gradual contraction of the bladder until it may be able to hold only an ounce. At this point there is a tremendous amount of frequency, which is accompanied by a good deal of pain. These patients may have to urinate every five to ten minutes, day and night. A small capacity bladder often means bilateral kidney lesions. This frequency may go on for several years before signs of renal failure come on, and death is rather sudden. It sometimes happens that there is complete destruction of one kidney, producing the so-called "auto-nephrectomy." This means that the kidney parenchyma has been completely replaced by caseous material and has ceased to secrete urine. These kidneys will cast a shadow with the x-ray.

Symptoms.—The very early tuberculous kidneys do not produce symptoms, but usually the patient the urologist is asked to see does have symptoms. Some patients being examined in a routine way have not complained of urinary symptoms, but pus cells and tubercle bacilli have been demonstrated in the urine. Further investigation has revealed a lesion in one or both kidneys. One patient in our series had no

urinary symptoms whatever, but a very few pus cells were found in the urine at an insurance examination. Cystoscopic investigation showed that pus and tubercle bacilli were being excreted from the right kidney, and a small cavity was demonstrated in a pyelogram. This kidney was removed and a cavity as big as a marble found in the lower pole.

In our series the main symptom was frequency (83 per cent). Sixty-seven per cent had painful urination and 35 per cent had hæmaturia. Pain in the flank was present in 14 per cent only, that is, a localizing pain over the affected kidney is less frequent than one would suspect. Tenderness over the kidney areas was present in 10 per cent. From these symptoms there is very little to localize the trouble in the kidney. They are the usual manifestations of cystitis, increasing in severity.

EXAMINATION

Physical examination.—In this series there was an active focus in the lung in 22 per cent. Bone and joint disease was present in 9 per cent, tuberculous adenitis in 1 per cent, tuberculous epididymitis in 12½ per cent, and a mass in the kidney area in 5 per cent. From these figures one sees that other foci of tuberculous infections are present, but in a small percentage. Lesions in the lung are the most common but form a much smaller group than one would suspect. Epididymitis is also present in a small percentage.

Urine examination.—The specimens of urine were acid in reaction, contained some albumin, pus cells, and many had red blood cells. Tubercle bacilli were found on direct smear in 72 per cent of the patients. These examinations were done in the bacteriological laboratory of the Toronto General Hospital from the sediments obtained with a high speed electric centrifuge. Guinea pigs were not injected when the tubercle bacillus was found on direct smear.

The value of the guinea pig in diagnosis.—The guinea pig is used as an aid in the diagnosis of tuberculosis. One believes a positive guinea pig inoculated with the urine points to tuberculosis, while a negative guinea pig is interpreted to mean the absence of urinary tuberculosis in that patient. Both these statements are true to a degree only. In our series were four patients with extensive tuberculosis in the kidneys and

bladder and negative guinea-pig tests were obtained. This is rather disconcerting, but if one persists in examination by guinea pigs of the urine from these patients over a period of a year, numerous positives and numerous negatives will appear. There is a periodicity in the excretion of tubercle bacilli in the urine. Also, a very dilute specimen of low specific gravity may contain very few bacilli and these may not be picked up in the centrifuged specimen. There were two cases of bilateral renal tuberculosis, with partial auto-nephrectomy on both sides as shown by the x-ray, and negative guinea pigs were obtained on repeated examinations. It is said that bacilli are present in very small numbers or absent in the urine of those with far-advanced kidney lesions.

I have had two patients, both middle-aged women, in whom positive guinea pigs were found unexpectedly. One had a positive left specimen with no pus and a negative bladder specimen. Tuberculosis was not suspected. She has been followed and there have been no pus and negative guinea pigs over a period of eight years. The other patient has had a similar history. In another instance two guinea pigs were injected at the same time from the same kidney specimen. One was positive and one was negative. This specimen was from the good kidney and the report was received *after* the other kidney had been removed. This patient has been followed for two years and the urine is free from pus; there is no frequency and he is quite well. In our series guinea pigs were not necessary for a diagnosis in all cases, but 11 per cent were negative in the presence of renal tuberculosis. From this brief outline one will see that the guinea-pig test is not infallible, and both positive and negative reports must be taken with a certain amount of reserve.

Cystoscopy.—The bladder mucosa varies according to the amount of inflammation present. In some of these patients tubercles were present in the mucosa, and more especially around the ureteral orifices. Ulceration was also seen. The small capacity bladder usually bled very easily. The ureteral orifices could be found with difficulty when profound inflammation was present. Indigocarmine was used intravenously sometimes, and helped a good deal in locating the ureteral orifices.

DIAGNOSIS

The diagnosis is made by finding pus cells and tubercle bacilli in the urine from the kidney. A pyelogram which demonstrates a cavity is also of great aid.

Uroselectan has been used a good deal, but is not of much use to distinguish a tuberculous cavity from a hydronephrosis. The lining of the cavity is smooth in outline, in place of the mottled outline which the ordinary retrograde pyelogram shows.

The value of the x-ray and the pyelograms.—A plain roentgenogram should be made in all patients who are to have a complete kidney investigation. This may be taken before or during the cystoscopic examination. It will detect small calculi, and also will rule out a tuberculous autonephrectomy. These appear as a cloudy density in the kidney area. Irregular cavities can be seen where a caseo-cavernous tuberculosis of any size is present. Some very small early cavities are very hard to diagnose and are often missed in a pyelogram which is considered normal.

TREATMENT

The primary consideration in treatment is to recognize that the local urinary lesion is part of a generalized condition. With this in mind, one examines the patient carefully for evidence of any other active focus which may need consideration, and then the decision is made as to the treatment for the renal tuberculosis. The presence of an active pulmonary lesion is not a contraindication to nephrectomy, provided the patient is constitutionally sufficiently strong to stand the operation. Once the large massive infection in the kidney is removed, he is better able to cope with the other lesions.

A unilateral lesion in the kidney is removed by operation. A bilateral lesion is left alone. Some surgeons advocate the removal of a tuberculous pyonephrosis or an advanced renal involvement if there is a lesser lesion on the other side. This procedure is not carried out here, but the bilateral lesion is left alone. In two patients the whole ureter and the kidney were removed at once. The lower portion of the ureter was separated and tied where it entered the bladder and freed up as far as could be reached. A kidney incision was made and when the kidney was removed the whole ureter was drawn out at the same time.

Treatment of tuberculous cystitis.—Tuberculous cystitis is the most distressing condition these patients have and unfortunately we can do very little for it. The frequency may be so severe as to necessitate urination every 10 to 15 minutes, day and night. This is accompanied by severe pain in the penis during and after micturition. The milder degrees of inflammation subside in from one to three years if these patients are kept on a general anti-tuberculous regime of good food and plenty of fresh air and rest. The more severe cystitis will improve following the removal of the kidney which is feeding the infection to the bladder. Here, the inflammation has involved the submucosa and the muscular coats of the bladder causing a contracted bladder with a very much decreased capacity which will not dilate to its former size.

In a patient who has a very small contracted bladder and a good non-tuberculous kidney remaining there may be intense distress due to the frequency and the pain on voiding. The ureter might be transferred to the large bowel or to the skin by transplantation. Both these procedures have been carried out successfully. There is little danger in transferring the ureter to the surface and the urine must be collected in a bag from a catheter inserted into the ureter. The patient manages the bag without any trouble and is able to sleep without the interruptions of voiding. The transplantation of the ureter to the bowel is more dangerous, but once it is accomplished the patient voids the urine from the rectum every three to four hours. I saw two of these patients who had been operated on by Stevens, of the Bellevue Hospital, who were very comfortable indeed.

A method of treating the pain of the cystitis is section of the presacral nerves. One patient referred by the Weston Sanitarium had frequency every 22 minutes night and day, with a bladder capacity of $1\frac{1}{2}$ ounces. He had intense pain on voiding which kept him disturbed day and night. The presacral nerves were excised in the hope of relieving his pain partially. The bladder pain was completely relieved, while the urethral pain was partially so. He suggested that 70 per cent of his pain was gone. His frequency was decreased to every 36 minutes and the amount of each voiding increased to $2\frac{1}{2}$ ounces, from $1\frac{1}{2}$ ounces. He was very much relieved and made a great deal more comfortable by this procedure. This relief has continued

for a year and a half. Recently there is a decrease in the bladder capacity and a slight increase in the pain.

Treatment of the nephrectomy wound.—A great problem for the urologic surgeon is to settle in his own mind the proper method to treat the stump of a tuberculous ureter, and also whether to insert drainage into the wound from which the kidney has to be removed. The following treatment has been carried out in these 56 nephrectomies. The ureter was clamped and cut across by a cautery. The cut end was ligatured and dropped back into the wound. The point of cutting the ureter was as low as one could reach from the nephrectomy wound. Table II shows the result of the healing of the wounds.

TABLE II

				Per cent
No tube	{	No sinus	15	83
		Sinus	3	17
Tube	{	No sinus	31	84
		Sinus	6	16

The tube used in these patients was a small thyroid rubber tube, the size of a 16F. rubber catheter. No rules were laid down as to when to use a tube and when to close the wound tightly. In these patients the use of a tube depended largely on the attitude of the surgeon at the time of the operation. Each tube used was removed at the end of twenty-four hours. From this small series there was no difference in the wound whether a tube was used or not. In one patient a cigarette drain and rubber tube was used. The wound broke down completely. There were sinuses in 16 and 17 per cent, respectively, with a tube for drainage or without one.

Treatment of the open tuberculous nephrectomy wound.—It happens occasionally that even with the most careful technique the wound breaks down. This does not usually occur along its whole length, but the sinus beneath the skin runs the whole length of the wound. These wounds may take many months to heal completely, and leave a very much inverted scar. Healing can be accelerated by the excision of the whole area of tuberculous granulation. The areas of skin covering the sinuses are opened. Any sinuses deep down are curetted to remove the tuberculous granulations. The whole wound is drawn together by a series of figure-of-eight silk-worm gut sutures. These wounds heal by

first intention and the patient's convalescence is very much shortened.

MORTALITY

In this series of 83 patients suffering from renal tuberculosis, 56 nephrectomies were carried out. There was one operative death, or slightly under 2 per cent. This was a boy, 18 years of age, who developed an acute respiratory infection twenty-four hours after his operation and died twelve hours later. His pre-operative examination did not reveal any contraindication, and the operation was carried out without any difficulty and a small tube left in the wound. He was a Jewish patient and no autopsy could be obtained. Of the 83 patients studied 17, or 20 per cent, are known to be dead. Of these, 3 were not operated upon, but died from generalized tuberculosis shortly after admission. This series has not been running long enough for good mortality figures.

Wildbolz's⁵ series of more than 1,000 cases of renal tuberculosis with 660 nephrectomies had an operative mortality from 2.2 to 2.5 per cent. Of 341 cases who had been operated upon previous to 1918 he traced 270 and found that 40 per cent were dead. Of these, half had died of tuberculosis in the opposite kidney, phthisis and miliary tuberculosis. Fifteen per cent died of intercurrent diseases, while the remainder died of various tuberculous lesions. Of the patients followed 59 per cent were cured of their urogenital tuberculosis. Rafin and Suter reported 55 to 60 per cent of their patients as cured of their unilateral tuberculosis. From these figures one can say that a patient with unilateral renal tuberculosis has a 60 per cent chance for cure.

REFERENCES

1. MEDLAR, E. M., *Am. J. of Path.*, 1926, 2: 401.
2. BOOK, M. H., *Am. J. Path.*, 1933, 9: 5.
3. MEDLAR, E. M., *Urol. & Cutan. Rev.*, 1932, 36: 71.
4. MEDLAR, E. M. AND SASANO, K. T., *Am. Rev. of Tuberc.*, 1924-25, 10: 370.
5. WILDBOLZ, H., *J. of Urol.*, 1929, 21: 148.

OBSERVATIONS ON THE FUNDUS OCULI IN DIABETES MELLITUS*

(BASED UPON A STUDY OF 1,272 CASES)

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DIABETES is largely a disease of middle life.

It, therefore, occurs at the age when arteriosclerosis generally manifests itself. The diabetic, as well as the non-diabetic, is subject to a variety of disorders which in themselves may lead to eye lesions. A variety of disorders may therefore occur coincidentally with, but may not necessarily be the result of, diabetes, such as retinal arteriosclerosis, vascular disorders, optic neuritis, secondary glaucoma, etc. Cataract and retinitis are the most frequent lesions met with in diabetes, while retinal arteriosclerosis, disturbances of accommodation and refraction, iritis, chronic retro-bulbar neuritis, amblyopia and muscular disorders are not infrequent. The soft eyeball found in diabetic coma is pathognomonic and, therefore, of great diagnostic value, particularly in the differential diagnosis of diabetic and insulin coma.

In an analysis of 1,000 persons with diabetes mellitus, Cammidge¹ found 48 cases of retinitis and retinal hæmorrhages—a combined incidence of 4.8 per cent. In the above report, Joslin's percentage is quoted as 5.2 and that of von Noorden's as 17. Cammidge suggests that the differences in percentage noted are due to the variations in forms of diabetes of different countries. Amongst 477 diabetics, von Noorden found 279 ocular lesions, with the following frequency distribution:—

Retinitis	81
Retrobulbar neuritis	23
Optic nerve atrophy	18
Cataract	62
Iritis	2
Amblyopia without organic change	33
Diabetic myopia	21
Other conditions	39

The etiological factors in the production of ocular lesions in diabetes are many. Abnormal carbohydrate metabolism leads to hyperglycæmia. The excess blood sugar invades the ocular circulation and, thereby, as a result of local physico-chemical conditions, enters the surround-

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ing tissue, the ocular fluids and lens. There is reason to suspect that some of the products of altered metabolism of the diabetic may act as toxins and thus affect some of the ocular structures. This view is supported by the findings in severe diabetes with marked lipæmia and lipæmia retinalis. That the ophthalmoscopic picture is not entirely due to the amount of fat in the blood, but also to some toxic action on the blood vessels, is suggested from our experiences with a case of lipæmia retinalis² and those with diabetes and marked lipæmia reported elsewhere.^{3, 4} Other than the soft eye-ball in coma, lipæmia retinalis is probably the only lesion of the fundus pathognomonic of diabetes; it involves both eyes and the condition is rare. In the series of 1,272 cases reported here it was found once only.

It has frequently been stated that retinitis due to diabetes alone never occurs. This statement is supported by the failure to observe a relationship between severity of the diabetes and incidence of retinitis. As retinitis is, however, an expression of vascular disease, attention is called to the observations of Rabinowitch⁵ on diabetic gangrene, namely, that in the series of cases investigated the gangrene was not related to the severity of the diabetes but to the time during which the disease was uncontrolled. Another similarity between retinitis and gangrene is the time interval observed between the onset of the diabetes and occurrence of these complications. As in gangrene in general, the older the individual was at the time of the development of the diabetes, the shorter was the time between the discovery of the diabetes and the occurrence of the retinitis. Further suggestive of a direct causal relationship between diabetes and retinitis is the experience of Adams.⁶ This author reported a case of diabetic retinitis in a patient aged 22 years in whom nothing abnormal was found other than the diabetes. Diabetic retinitis was found in one eye, with the typical hæmorrhages in the other, with no obvious signs of disease of the blood vessels elsewhere and with a normal blood pressure, namely, 100/75.

As diabetes is largely a disease of middle life, the retinal vessels show definite evidence of varying degrees of arteriosclerosis. Hypertension, if present, is apt to aggravate the lesion of the fundus. Some clinicians regard the hypertension as a forerunner of arteriosclerosis, and there is hardly any doubt that in many cases the diabetes is secondary and due directly to

the arteriosclerotic process. When retinitis in the diabetic is complicated by nephritis or arteriosclerosis, the retinal picture is not especially characteristic of either of these diseases. Accurate differentiation of the various types of retinitis is possible only by chemical analyses and under proper test conditions. This also enables one to estimate the functional efficiency of the kidneys.

While there is a marked similarity between diabetic, renal and arteriosclerotic retinitis, there are not many cases in which it is possible to state dogmatically from an ophthalmoscopic examination alone that a retinitis is due to diabetes; nevertheless, Foster Moore⁷ believes that there are features which, while they are not pathognomonic, when combined form a picture which is sufficiently characteristic to enable one to attribute the condition to diabetes. The writer agrees with this view. These features are:—

1. The patches of retinal exudate in diabetes tend to have sharp-cut edges, are often solid and soapy or waxy-looking, are usually distributed in an irregular manner, and sometimes form an irregular ring well wide of the macula.

2. A star figure is uncommon, and, if present, it does not acquire the degree of symmetry that may be seen in renal cases.

3. The soft-edged cotton wool patches, so frequent in severe renal cases, do not appear in diabetes; retinal œdema is never so marked, and thus retinal detachment does not result.

4. Retinal hæmorrhages are generally in the deeper retinal layers, and, therefore, are roughly circular in outline instead of being flame-shaped.

5. The circular retinal pigment spots, which are not rare in the later stages of renal retinitis, are not seen, I think, in diabetes.

In a series of 1,272 cases in the Clinic for Diabetes at The Montreal General Hospital under the care of Dr. Rabinowitch, the following lesions were found:—

Cataract	86
Retinal hæmorrhages	22
Arteriosclerosis of retinal vessels	34
Retinitis	39
Diabetic retinitis	21
Neuro-retinitis	9
Macular changes	3
Disseminated choroiditis	1
Choroidal changes	6
Iritis	3
Glaucoma—non-inflammatory	4
Optic atrophy	1
Zonular cataract	1
Interstitial keratitis	2
Folds in Descemet's membrane	1
Pannus	1

Detachment of retina	1
High myopia	1
Disturbances of accommodation	13
Proliferating retinitis	1
Lipæmia retinalis	1

According to the above list, it will be observed that there were 127 persons with retinal lesions. Thus:—

Retinal hæmorrhages	22
Retinal arteriosclerosis	34
Neuro-retinitis	9
Retinitis	39
Diabetic retinitis	21
Proliferating retinitis	1
Lipæmia retinalis	1

The ages of the 21 patients with diabetic retinitis were as follows: 43, 44, 46, 47, 48, 48, 52, 54, 54, 56, 56, 58, 59, 59, 63, 63, 65, 68, 69, 70, 71. It is of interest to note that all except 5 of these patients were also suffering from cardio-vascular-renal disease. The diagnosis of typical diabetic retinitis was made because of (a) the sharp edges of the retinal exudates; (b) the chalky white colour, and (c) the irregular distribution of the latter. The retinal hæmorrhages were numerous—small and not flame-shaped. Circular retinal pigment spots were not seen, and the lesions were scattered profusely over the retina with marked predominance over the macular area.

With regard to the retinal as well as to the other ocular lesions found clinically in association with diabetes, there arises the difficulty of distinguishing between the direct effects of diabetes through premature senility and arteriosclerosis which it produces. All sorts of senile and arteriosclerotic retinal lesions occur in diabetics as well as in non-diabetics, but none of these lesions are found in diabetes free from arteriosclerosis. Nevertheless, it seems definitely established that there is one particular form of retinitis which occurs much more frequently in those arteriosclerotics who have diabetes than in those who do not, and it would seem at least that there is some causal connection between the diabetes and the type and distribution of the arteriosclerotic process that accompanies it. This is the so-called diabetic retinitis, which is characterized ophthalmoscopically by the presence of small punctate hæmorrhages and chalky-white dots especially in the macular region. These white dots on section are found to be masses of colloid in the outer layers of the retinitis and arteriosclerosis (Friedenwald³).

"It is reasonable to suppose that the deficient circulation in arteriosclerosis may tend to intro-

duce differentiating peculiarities, and that in diabetes the upset in the water balance which in the lens gives rise to acute myopia, and later to diabetic cataract, and in the posterior epithelial layers of the iris produces an oedematous disturbance, should be able to influence in a similar manner the backward continuation of this layer in the retina, producing on occasion manifestations of the disease in this tissue with clinical characteristics of its own"⁹—diabetic retinitis.

The records of large clinics for diabetes indicate that, with the introduction of insulin, coma has largely disappeared as a cause of death. On the other hand, insulin appears to have had no favorable effect upon the mortality from cardio-vascular complications. As a matter of fact, the data of such clinics clearly indicate that cardio-vascular disease is the chief cause of death, when consideration is given to the fact that, regardless of whether the individual died of cerebral hæmorrhage, gangrene, coronary thrombosis, heart failure, or angina pectoris, death was due to cardio-vascular disease. The only means of controlling this condition is to detect it in its early stages. For this reason, a careful physical examination is essential, including estimation of blood pressure, measurement of the size of the heart, etc. In spite of the most careful examination, however, one may fail to detect arteriosclerosis in many cases. X-ray examination of the blood vessels of the feet for the detection of calcification is a routine in the clinic for diabetes in this hospital. Such examination may also fail in many cases. Our routine, therefore, includes examination of the fundi. Our experiences have taught us that examination is not an adjunct but a necessity, since arteriosclerotic changes in the finer blood vessels may be found long before the x-ray shows calcification, and, also, before there is hypertension, enlargement of the heart or other clinical signs of arteriosclerosis.

I have much pleasure in thanking Dr. I. M. Rabinowitch for the opportunity of seeing these cases and for his interest in the examinations.

REFERENCES

1. CAMMIDGE, P. J., *Arch. of Ophth.*, 1930, 3: 248.
2. MCKEE, S. H. AND RABINOWITCH, I. M., *Canad. M. Ass. J.*, 1931, 25: 530.
3. RABINOWITCH, I. M. AND MILLS, E. C., *J. Metab. Res.*, 1926, 7-8: 87.
4. RABINOWITCH, I. M., *Am. J. M. Sc.*, 1928, 176: 489.
5. RABINOWITCH, I. M., *Canad. M. Ass. J.*, 1927, 17: 27.
6. ADAMS, P. H., *Brit. J. Ophth.*, 1932, 16: 38.
7. MOORE, R. F., *Medical Ophthalmology*, 2nd ed., Churchill, London, 1925.
8. FRIEDENWALD, J. S., *The Pathology of the Eye*, Macmillan, New York, 1927.
9. DUKE-ELDER, W. S., *Recent Advances in Ophthalmology*, Churchill, London, 1927.

THE APPENDIX PROBLEM*

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APPENDICITIS is the most common of all major surgical diseases, and the most fatal. In spite of skill and the vast number of surgeons, deaths from appendicitis continue to mount from year to year, and are now far in excess of twenty-five years ago. In 1923 there were 125 deaths from this cause in Alberta, while in 1930 there were 137. It is not sufficient to say that they were neglected cases, because we find that 120 of these 137 deaths followed operation, so that we must admit that our surgical procedures were not adequate in these 120 cases.

Would not this Association be performing a useful work in investigating the circumstances surrounding all these deaths? Surely our profession can save many of them. From this cause 15,000 people die annually in the United States and about 1,500 in Canada, a condition which is a standing challenge to those of us who practise surgery.

We know very little as to the cause for the vast increase in the incidence of appendicitis. Two facts stand out in this regard. Appendicitis is very rarely found in primitive peoples who live upon simple natural unprepared foods, and its incidence has vastly increased since we have largely changed our food habits and are now using in far greater proportion refrigerated, preserved and proprietary foods. Some observations made among the southern negro are also suggestive. Appendicitis is comparatively rare among the negroes on the plantations and the land where they live upon simple unadulterated native food, but increases enormously when they move into the cities and adopt the food habits of the white man. Many of our acute cases had received purgatives, and this undoubtedly produces harm. The public must be educated to the fact that abdominal pain always means something, and that a purgative should never be used in the presence of abdominal pain except under medical advice.

With these facts in mind and in a desire to

study the best methods of attacking all phases of this condition, I have analyzed all cases treated at the Calgary Associate Clinic for the past five years. I append a Table showing the number and results.

TABLE I

<i>Cases</i>	<i>No.</i>	<i>Deaths</i>	<i>Percentage</i>
Acute—non-perforated	287	1	0.35
Perforated with peritonitis ..	35	3	8.60
Abscessed cases	29	1	3.80
Interval cases	221	2	0.90
Chronic cases	26
Total cases	598	7	1.10
Total acute cases	351	5	1.40
Children under 15	114	1	0.87
45 years or older	24	4	17.00
Post-operative obstructions ..	7	1	14.00
Post-operative pneumonias ..	10	2	20.00

There were 598 cases with 7 deaths, a mortality of a little over 1 per cent. Of these there were 351 acute cases with 5 deaths, a mortality of 1.4, and 247 interval or chronic cases with 2 deaths, a mortality of 0.8.

A study of the mortality list in most hospitals would appear to show that the death rate is far too high. Some years ago I¹ reported all the cases in the Calgary hospitals for a period of two years and found a mortality of about 8 per cent in acute cases. Recently Miller² has reviewed the mortality statistics in two large hospitals in New Orleans covering a period of six years, and they give a rate of 9.9. A review of the literature and the mortality rates clearly indicate that in acute cases, even with operation, the mortality is from 6 to 10 per cent, which we consider far too high. For this reason Sir James Barry³ has recently raised the issue as to whether operative treatment is justifiable. A careful study of his paper would indicate that the controversy really turns around abscessed and delayed cases. He is quite in accord with the modern treatment when used early before perforation. We believe his stand is due to an experience of appendicitis when it was not so widespread or as virulent as to-day, and to a higher mortality in those late cases than is necessary. In our series we had 35 cases of more or less spreading peritonitis, with only 3 deaths,

* Read before the Alberta Medical Association meeting, September 21, 1932.

and we had 29 abscesses with 1 death. The vast majority of those manifesting these serious conditions would have surely died without operation. It has been our practice in all cases to operate as soon as the case presents and the diagnosis made and our results do not make us regret this practice. We do not believe that any expectant treatment could have produced a lower mortality rate; rather, we should expect a much higher one.

We have divided our cases into acute, chronic, and interval.

Acute cases.—These consisted of 287 not perforated, with 1 death from pneumonia on the sixth day; 35 cases of more or less spreading peritonitis, with 3 deaths, 1 from intestinal obstruction, 1 with extensive cellulitis of the abdominal wall and septicæmia, and 1 from cholangitis; 29 cases of localized abscess, with 1 death from pneumonia.

The chronic or interval cases.—Of these there were 247 in our series. All except 26 had had definite acute attacks. We have about reached the conclusion that any case in which there has not been a clear-cut definite attack is probably not appendicitis. There appears to be a small series of cases that are an exception, where the pain and tenderness are strictly localized to the appendix and not accompanied by digestive symptoms. These get complete relief following appendectomy. These cases are proportionately few, only 26 in our whole series, and are tending to get less and less as the years go by. They must be selected with a good deal of hesitation. The great number of patients one sees who have had their appendices removed without relief of symptoms convinces one that chronic appendicitis of this type is largely a surgical myth. The patient, usually a woman, who has chronic abdominal pain, perhaps more marked and in some cases confined to the right side, together with digestive symptoms and a certain amount of neurosis, most certainly has not appendicitis, but more likely colitis or ptosis. I would like to protest emphatically against the far too common custom of asking the x-ray man to make a diagnosis of appendicitis. A large experience with gastro-intestinal x-ray has convinced us that it is of very little or no value in the diagnosis of appendicitis. Whether the appendix fills or does not is no sure indication of disease. About its only value is the localizing of the point of tenderness to the appendix or otherwise. We

gravely suspect that the x-ray report is often used as a lever to obtain consent for a possibly unnecessary operation. We had 2 deaths among our interval cases, both from pulmonary emboli, which well illustrates the fact that no operation is without some danger.

THE ACUTE CASES

The diagnosis in acute cases.—In many cases it is simple, but in others presents the greatest difficulties. A carefully taken history is of the utmost importance. Pain as a primary symptom, felt in the epigastrium or umbilical region, often accompanied by vomiting, is of the greatest significance. Localized tenderness is perhaps the most constant sign, but this, like all other signs, occasionally fails. Leucocytosis is fairly constant but in mild and in some severe cases is not present. The pulse and temperature are often not elevated in the early stages. Only by constant and repeated observations and a careful consideration of all the factors can one avoid mistakes. We believe it safe to keep the patient under observation for 12 hours and, in doubtful cases, if symptoms are still obscure but not subsiding, exploration had better be done. The earliest perforation in our series was at the end of 12 hours from the onset of symptoms. In 2 others it occurred at 18 hours, and in all the others 24 hours or later, so if doubt exists as to the diagnosis, one may safely wait for 12 hours. Such conditions as salpingitis, ectopic gestation, renal colic, gall-bladder disease, perforated ulcer, acute obstruction, and lung condition have to be remembered. We do not find so much trouble in excluding other conditions as in overlooking an obscure diseased appendix; such cases for instance as are accompanied by acute diarrhoea, the early gangrenous retro-cæcal cases with very few symptoms, the occasional case with pain on the left side, and that in the elderly patient are difficult. Wilkie⁴ has recently made an interesting division of these cases into the acutely inflamed appendix, and the acutely obstructed appendix which quickly produces strangulation and consequent gangrene with perforation, etc. While this distinction can undoubtedly be made in many cases, in others it can not, because perhaps few diseases present themselves in so many atypical forms as appendicitis, and for all practical purposes every acutely affected appendix should be removed in any case. The diagnosis of the perforated and abscessed cases

is usually easier than that in an acute case. The diagnosis of the interval case must of course depend largely upon the history and the exclusion of any other abdominal condition.

Sex.—Our series showed the sexes to be pretty equally divided, with a slight majority of males.

Age.—This varied from 3 to 66, with the greatest number in young adults. One hundred and fourteen were below 15 years of age. This series bears out the general impression that acute appendicitis is fairly common in children and runs a rapid course, as 23 of these 114 cases had perforated, with an abscess or some spreading peritonitis. Our experience does not bear out the general impression that the mortality rate is high in children, as of these 114 cases we only lost 1. In fact, there is considerable evidence that the mortality rate in elderly people is far above the average. Four of our 7 deaths were in persons above 45 years of age.

The anæsthetic.—This has been entirely satisfactory. In no case have we had any difficulty or anxiety, and never even had an occasion requiring resuscitation. Ether, for the most part, is the anæsthetic of choice. In some severe cases, and where the patient prefers it, nitrous-oxide and oxygen are given, and also as a preliminary in many of the ether cases. Occasionally a local anæsthetic is used, but in an acute or difficult case we believe it better to have the patient relaxed. Spinal anæsthesia was used in one case. We hesitate to use this method except for some very special reason. Our results with ether and gas-oxygen are so uniformly good that we do not think we are justified in an extensive use of a method which sometimes at any rate may produce a very disastrous outcome. We use morphine and atropin as a preliminary. In a very nervous patient we use phenobarbital or amytal the night before, and perhaps also in the early morning it may be advantageous. It is true that we had 10 cases of pneumonia with 2 deaths, but 1 occurred 5 days after operation, and the other was a typical influenzal type and could not be blamed on the anæsthetic.

Treatment.—All operative work in this series was done by Dr. D. S. Macnab or myself. A uniform method and after-treatment were carried out. We believe there is considerable value in rapidity in operation, provided this can be done without sacrificing efficiency, and with as little traumatism and disturbance to

the abdominal contents as possible. Ten or 15 minutes is the usual length of time required, unless some unusual difficulties are encountered.

(a) *Acute non-perforated cases*—287 in number. The appendix was removed in all cases. The abdomen was closed without drain, except in a few cases where there was considerable raw surface or bleeding, when drainage was established for 24 hours. We used the Fowler position and morphine enough to produce sleep and rest to the peritoneum. Fluids by the mouth were withheld for 24 hours. The Murphy drip by rectum was used and, if the patient was dehydrated, intravenous saline as required. A bowel movement was secured by enema on the 3rd or 4th day; no purgative was given. The patient was out of the hospital in an average of 12 to 14 days. We realize that it is possible to get them out much earlier than this, but we believe the rest in bed beneficial and we also insist upon an adequate rest after leaving the hospital, especially in women, as a preventive of neurosis later. We only had wound-infection in a few cases and in no case did a peritonitis or intra-peritoneal abscess occur.

(b) *Perforation with spreading peritonitis.*—The appendix was rapidly removed, unless this presented unusual difficulties. Pus was carefully sucked out and rubber tube drainage was employed, multiple if necessary. An extreme Fowler position was employed and nothing by the mouth was given until the symptoms of peritonitis subsided. The Murphy drip and from 2,000 to 3,000 c.c. of saline and glucose by vein were given daily until the peritoneal symptoms subsided. We used gastric lavage if necessary and sufficient morphine to control pain and all abdominal movements. The mortality in this type of case is bound to be somewhat high, although it is interesting to note that not a single case died of the original peritonitis, although we had some of the so-called general variety. One man for a full week hovered between life and death with a very rapid pulse, cyanosis, distension, vomiting, etc., and was kept alive with salines and glucose with gastric lavage, and he eventually recovered. There were 35 of these cases with 3 deaths; one, a child, was making a good recovery when she developed obstruction and it was impossible to free the obstructed bowel without breaking into the septic wound, with a consequent secondary peritonitis; another was recovering from the

peritonitis and developed an intense cellulitis spreading all over the abdomen into the thigh and the back, and died from what appeared to be toxæmia or septicæmia; another in an old man who developed what appeared to be a cholangitis after the peritonitis had subsided. There is a moderate amount of wound infection in these cases but most clear by the time the peritonitis subsides. The average length of stay in the hospital was 21 days.

(c) *Abscessed cases.*—These cases require the greatest care and skill, and it is in these that many surgeons, especially in England, advise delay. We feel that, properly treated, there is no advantage in delay. They must be treated with the greatest gentleness, the abscess opened at its most accessible point, and under no circumstances must any adhesions be disturbed. The appendix must not be searched for. If it presents itself it may be removed, but only where this can be done with no breaking down of the abscess wall or adhesions. In about one-half of our cases, we were able to remove the appendix. In all these cases we advise the subsequent removal of the appendix although the patients do not always follow our advice. We had 5 patients who had previously had an abscess drained, and in these cases we found no difficulty in finding or removing the appendix. One returned with a second abscess and we removed an appendix where the patient had previously had two drainage operations. We had 29 of these cases with 1 death. This patient was a middle-aged man operated on in the winter time when there was considerable influenza about, and he developed a typical influenzal pneumonia 36 hours after operation, became cyanosed, his lungs filled up, and he died in about 24 hours. The average length of stay in the hospital for these cases was 18 days.

INTERVAL AND CHRONIC CASES

These were all carefully investigated by gastric analysis, x-rays, etc., for the detection of any other lesions. A larger incision was made and the abdomen thoroughly explored and any pathological condition rectified. In 6 cases we found associated gall stones, and in 4 we found ovarian cysts, 1 of which was a dermoid. We had 247 cases of this type with 2 deaths, both from pulmonary emboli. These were the only cases of emboli in our whole series, and we know of no way of preventing this unfortunate

calamity. These patients remained at the hospital from 12 to 14 days.

COMPLICATIONS

1. *Intestinal obstruction.*—There were 7 such cases with 1 death. These occurred as early as the 8th day and as late as the 25th. We are only considering those cases which occurred before the patient left the hospital. The diagnosis is usually not difficult and procrastination must not be allowed. Unless they improve in 12 to 24 hours operative measures must be carried out. The great danger is the presence of a septic wound, but this can be sealed off, and if it be possible to free the bowel without breaking into a septic tract all will be well. All our cases were operated upon and although 5 had septic wounds, yet all recovered except 1, a small child where it was impossible to prevent contamination of the peritoneal cavity. One case had an obstruction 14 days after operation, relieved by operation, and had another obstruction 9 days later, also relieved by operation, and has been quite well ever since.

2. *Pneumonia.*—Ten cases with 2 deaths, a rather high mortality. Both the deaths were in rather subnormal middle-aged men, one case being of a decidedly influenzal type.

3. *Pregnancy.*—There were 5 cases, varying from the 2nd to the 7th month. All recovered without subsequent abortion.

4. *Pyelitis and nephritis.*—One case which remained for several months, but eventually recovered.

5. *Phlebitis.*—Two cases, only 1 of which was at all severe, and this case eventually entirely cleared up.

6. *Sub-diaphragmatic abscess and empyema.*—One case. This was a very severe general peritonitis in a child who had a hard struggle for life. Some months later she developed two abscesses in the abdomen which were drained, and later a sub-diaphragmatic abscess and empyema, which was also drained, with eventual recovery.

7. *Diabetes.*—Two cases. These did not present any great difficulty and made the usual recovery. Such cases do not forbid operative procedures, provided the diabetes is recognized and adequate treatment carried out.

8. *Acute dilatation of the stomach.*—Two cases. With gastric lavage and turning them on their stomachs both patients recovered.

9. *Opening of the wound.*—Two patients had the wound break open, with protrusion of the bowel. They were resutured and recovered. These cases usually come about the 12th or 14th day where there has been a very mild infection which seems to prevent any union of the various layers of the abdomen, and a very slight force pulls the incision open.

We append a brief summary of the fatal cases.

CASE 1

A female, aged 26, who had had several very definite acute attacks. At operation she had a large cystic appendix. She made a good recovery for 10 days and was being given an enema when she had severe pain in the chest and died inside of 15 minutes.

CASE 2

A male, aged 47, who was rather stout and not of very good colour. He had had several rather severe attacks. No abnormality could be found in his heart or other organs before operation. He bore operation well and for 7 days was making the usual recovery, when he was suddenly seized with pain in his chest, shortness of breath, a very rapid pulse, and some cyanosis. He recovered from this slightly, but a little later developed a similar attack and died with a diagnosis of embolism.

CASE 3

A male, aged 45; an acute appendicitis case, without perforation. He did well for 4 days; on the 5th day he developed a fairly typical lobar pneumonia and died in 36 hours.

CASE 4

A male, aged 50, had a perforated appendix with a small abscess. The appendix was removed and drainage established. Thirty-six hours later he developed a typical influenzal pneumonia with much cyanosis. The lungs were extensively involved with many râles, and he died in 24 hours.

CASE 5

A female child, aged 5, who had an acute perforated appendix with a small amount of spreading peritonitis. The appendix was removed and drainage established. She did well for 10 days and was well on the road to recovery when she developed an intestinal obstruction. She was operated on through a mid-line incision after sealing off the wound, but in freeing the obstructed bowel we broke into the septic sinus and she died a few days later, probably of a secondary peritonitis.

CASE 6

A male, aged 56, a rather subnormal man. He had had a gangrenous ruptured appendix with some spreading

peritonitis, but he did well for 10 days. Drainage had been discontinued and his peritoneal cavity was free. He developed a chill and jaundice. There was a little enlargement of the liver dullness, but repeated explorations with a needle failed to reveal any localized collection of pus. The symptoms continued for about a week, and he died with a diagnosis of cholangitis.

CASE 7

A female, aged 16, who had had a ruptured gangrenous appendix removed and drainage established. She did well for the first 7 days, when she developed an intense infection in the wound, a spreading cellulitis of the whole abdominal wall, the right thigh, and the back. She ran a high temperature and became very toxic. In spite of multiple incisions and hot fomentations, she died with symptoms of toxæmia or possibly septicæmia. Her peritoneal symptoms had entirely cleared up.

CONCLUSIONS

1. The mortality of appendicitis in Canada and the United States is far too high, especially following operation.
2. We believe it possible to surgically treat all acute appendicitis with a mortality of about 1 per cent.
3. We believe that the surgical treatment of acute appendicitis requires the greatest skill and experience, and should not be attempted by the novice and the occasional operator.
4. We do not believe that anything is gained by the expectant treatment of acute appendicitis, provided proper surgical skill and care are used.
5. The chronically inflamed appendix is largely a surgical myth, and unless a history of an acute attack is established, one is rarely justified in removing it.
6. X-ray men should discontinue the practice of putting "chronic appendicitis" or "trouble in the appendix" on their reports, but should describe what they see and allow the surgeon to make his own diagnosis.

REFERENCES

1. LINCOLN, *Canad. M. Ass. J.*, 1925, 15: 1229.
2. MILLER, *J. of the Coll. of Surg. of Australasia*, 1930, 3: 40.
3. BARRY, *The Lancet*, 1932, 1: 1027.
4. WILKIE, *Brit. M. J.*, 1931, 1: 253.

THE "NORMAL" CARBON MONOXIDE CONTENT OF THE BLOOD.—Alexander O. Gettler and Marjorie R. Mattice, found that the average content of carbon monoxide in the blood of eighteen persons living in New York City under conditions of minimal exposure was found to be 0.27 volumes per cent. This represents about 1.0 to 1.5 per cent of the hæmoglobin combined with carbon monoxide. The average content of carbon monoxide in the blood of twelve persons confined to a state institution in an ideal rural locality was found to be 0.24 volumes per cent. Most of these showed a

hæmoglobin saturation of less than 1 per cent. The average content of carbon monoxide in the blood of twelve New York City street cleaners was found to be 0.69 volumes per cent. This represents about 3 per cent saturation of the hæmoglobin with carbon monoxide. Two taxicab drivers were found to have on several occasions a carbon monoxide content ranging from 1.47 to 4.33 volumes per cent. This represents a hæmoglobin saturation of 8.0 to 19.0 per cent. Tobacco smoking appreciably increases the carbon monoxide in the blood and cannot be ignored in the interpretation of laboratory results.—*J. Am. M. Ass.*, 1933, 100: 92.

SPINAL ANÆSTHESIA IN THORACIC SURGERY*

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ANÆSTHESIA in thoracic and lung surgery offers more real difficulties than is the case, probably, in any other branch of surgery, and the variety of methods employed in different clinics is evidence that no one of them is ideal from the standpoint of both patient and surgeon. That there is any problem in these patients is due almost solely to the presence of pulmonary disease, which is usually extensive in character. The patients to be reviewed in this communication suffered either from pulmonary tuberculosis or from extensive bronchiectasis. In either event they were handicapped from the standpoint of anæsthesia, regardless of the method used. The operations to be reviewed are extrapleural thoracoplasty for tuberculosis and lobectomy for bronchiectasis. The two groups will be considered separately, as the problem is not quite identical in the two instances.

Patients presenting themselves for thoracoplasty, while frequently in moderately good general condition, are really chronic invalids. They are mostly bed patients who have had extensive tuberculous pulmonary disease with its concomitants of long-continued fever and cough. They probably should be considered poor subjects for an inhalation anæsthetic of any kind. The first few operations were done with an intercostal nerve block combined with a sedative. There are objections, however, to this type of anæsthetic. The induction of such an anæsthesia for an extensive thoracoplasty is in itself a major procedure and is a strain on the patient. Next, nitrous oxide-oxygen, also with the addition of an effective sedative, was employed, sometimes in combination with an intercostal nerve block. This method is at present being used for thoracoplasty involving the upper ribs. Our objections to this procedure are, first, that secretions collecting in the bronchial tree are not readily cleared, even though the cough reflex is maintained; secondly, that it is frequently productive of surgical shock; and, thirdly, that the greatly increased pulmonary activity associated with

the inhalation anæsthetic is probably harmful. Latterly spinal anæsthesia has been employed for practically all thoracoplasties from the fifth rib downwards. We believe this method to be the most satisfactory one that we have yet used.

There are objections, of course, to the use of spinal anæsthesia in these operations, some of which are real and some theoretical. Even with a sedative it is somewhat of an ordeal particularly for sensitive natures, as traction on the ribs is interpreted as such, even if no pain is experienced. Further, high sub-dural block, generally speaking, is not to be recommended if some other anæsthetic will do equally well. Also it may be argued that it is unsound to reduce lung ventilation by paralyzing half the intercostal and all the abdominal muscles in a patient whose vital capacity is already impaired and who must be placed on his sound side. Again it might be expected that bronchial secretions under these conditions could not be cleared effectively.

In our experience of about 40 thoracoplasties with sub-dural block we have found that none of these objections has been encountered with sufficient regularity to be a feature. When a sedative consisting of a combination of morphia and a barbiturate is given, and the patient advised that he will experience tugging sensations which will be uncomfortable but not painful, the operation is not remembered as a particularly distressing ordeal. Severe circulatory or respiratory disturbances from the high block have not been observed as often as might have been expected. These patients are mostly young adults with sound cardio-vascular systems and in tolerably good general condition. In the presence of tuberculosis spinal anæsthesia would be chosen by many should they be faced with, perhaps, an abdominal operation. In this connection it should be remembered that a block which will produce adequate muscular relaxation for a gall-bladder operation will give ample anæsthesia for a lower thoracoplasty, with less circulatory depression as a rule in the extra-abdominal operation. Regarding respiratory disturbances, we find some cyanosis of frequent occurrence, but we believe this will be improved with oxygen more often than is the case with the cyanosis which

* Read before the Section of Anæsthesia, Academy of Medicine, Toronto, January 23, 1933. The surgical work was done on the Shenstone Service of the Toronto General Hospital.

develops in other types of patients with spinal anæsthesia, because it is more likely to be respiratory in origin than circulatory. Dyspnoea has been in no case sufficiently pronounced to cause any real concern. The cough reflex is not disturbed and these patients can clear their secretions without much difficulty.

The operation of lobectomy performed for bronchiectasis, besides requiring much more time, is seriously complicated by being intrapleural and, therefore, inducing sudden collapse of one entire lung. As a result of this collapse, considerable amounts of secretion are squeezed out into the bronchi and trachea, which makes it imperative either that the patient be able to cough or that means be at hand for prompt removal of this material by suction. This latter procedure may be carried out when some form of intra-tracheal anæsthesia is employed, and suction through or along side the catheter effected, as has been suggested by Waters and others. The same objections, however, applying to inhalation forms of anæsthesia for thoracoplasty are operative in the case of lobectomy, with the additional factor that large amounts of secretion are squeezed from the bronchiectatic cavities in the latter cases. With our experience in the use of sub-dural block in thoracoplasty to encourage us, we have used this same method in some 15 lobectomies. Preliminary phrenicotomy is necessary because the phrenic nerve carries sensory fibres from the mediastinal and diaphragmatic areas. Again, the immobilization of the operative area as a result of this procedure is of particular aid to the surgeon. Further, it may well be of benefit to the patient to have this preliminary partial immobilization of the lung in order to minimize the disturbance to him when the lung is suddenly collapsed on opening the pleura. With this latter idea in mind in some cases a preliminary partial pneumothorax is effected. Such a patient under the high block can clear himself surprisingly well. Moreover, being fully conscious, he can, on instruction, withhold his cough at critical moments of the operation. We usually produce an anæsthesia which will be of sufficient duration to allow completion of the operation in from one and a half to two hours without supplementation. Fortunately, we are not concerned with the problem of relaxation.

We favour this type of anæsthesia in these operations for several reasons. It is a much simpler procedure than an intercostal block, or an intubation under nitrous-oxide with the necessity

of providing for suction. The operations may be done more quickly and with less loss of blood. It produces a quieter operative field. Our patients leave the operating room in better condition than with any general or other regional method that we have tried. We also believe that their subsequent recovery is less eventful. We have had no patients succumb in the operating room in either series, nor have we had any operative deaths in which we felt the sub-dural anæsthesia to be in any way a factor.

With the exception of dosage, our technique for lobectomy is about the same as for thoracoplasty. In the latter case we ordinarily use 200 mg. of novocaine dissolved in 10 c.c. of spinal fluid, injected in the third lumbar interspace, with or without barbotage according to the individual preference of the anæsthetist. The injection is made with a number 19 gauge needle, the time of injection being about twenty seconds. The injection is made with the patient lying on his affected side, in which position he is left for several minutes. For lobectomy 250 to 300 mg. of novocaine are used. As the injection is made a five-degree tilt to the table will give a somewhat higher level of anæsthesia when that is desired. We have as yet to notice any evidence of phrenic nerve involvement. With this technique anæsthesia develops to about the fourth rib, and seldom any higher. If it fails to reach the desired level intercostal nerve block of the necessary segments is done, inhalation anæsthesia being avoided if at all possible, particularly in the operation of lobectomy. We have not as yet deemed it advisable to attempt upper thoracoplasty or removal of upper lobes with spinal anæsthesia.

It is our experience that a sedative sufficiently large to be effective contributes to the success of the operation. A restless patient is very trying to a surgeon endeavouring to remove a portion of lung. At the same time the cough reflex must be kept active. Morphia, gr. $\frac{1}{4}$, and nembutal, grs. 3, are given one hour before operation. If the patient is considered not sufficiently drowsy, morphia, gr. $\frac{1}{6}$, is added about three-quarters of an hour later. Ephedrine, gr. $\frac{3}{4}$, is administered about ten minutes prior to induction of anæsthesia. In lobectomy and in the poorer-risk thoracoplasties an intravenous infusion of saline by the continuous drop method is instituted as soon as the patient is in position on the table, the internal saphenous vein of the ankle being

used for this purpose. It is of particular value in these cases to keep the patient engaged in conversation. Oxygen is administered throughout the entire period of operation.

Our series is, of course, not large, but we feel that our results with spinal anaesthesia in this type of surgery are so favourable as to warrant a continuance of its use in all suitable cases.

THE TUBERCULOSIS CLINIC

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DURING the recent survey of tuberculosis work in Greater Vancouver some facts were brought to my attention which have suggested this article. The subject matter is applicable to other centres as well as to Vancouver and the Province. What may be considered a model clinic will be outlined.

In 1918 the Rotary Club decided to build and equip a special building for the diagnosis of tuberculosis. At the instigation of one member of the Committee, the building was called "the Rotary Institute for Diseases of the Chest". I mention this because it has a bearing upon the question under discussion—the model chest clinic. By the adoption of this title the scope of the clinic was enlarged, and it was to make the clinic a diagnostic centre for all chest conditions, not alone tuberculosis. This plan, however, did not materialize. Finances were hard to obtain and no surplus could be obtained to permit a wider diagnostic service than that devoted to tuberculosis. Consequently, although the medical staff were quite in favour of a wider policy, such could not be carried out. Shortly after the beginning of 1933 a new policy was undertaken in tuberculosis work. Tuberculosis in Greater Vancouver becomes a Department of Health problem and the Tuberculosis Division of the Department of Health will then have the responsibility of the tuberculosis clinic. With the establishment of this new responsibility it may be possible to bring about certain changes.

Let us first consider what a tuberculosis clinic should be. "It must constitute," as Sir Robert Philip expresses it, "a 'receiving house' and a 'clearing house' for the area served. On the one hand, it seeks facts regarding the extent and distribution of tuberculosis, the source and modes of infection, its clinical manifestations, and social results; on the other, by a study of the facts in individual cases and collectively, it en-

deavours to find means whereby the needs of the situation may be effectively met." The patient who comes to the clinic has his disease diagnosed and he is advised how best to care for himself and to protect others. But, if that is all that is done, the clinic falls far below the ideal. The admittance of the patient to the clinic should be the force which sets in motion the wheels of further endeavour. Other members of the patient's family should be examined and they should be taught prevention. The home conditions should be investigated and advice given as to their improvement. The patient himself should be persuaded to enter a sanatorium for both treatment and education. No one can learn to "take the cure" properly at home until he has seen and followed it under a supervised régime such as is found in the sanatorium. The conditions of employment should receive attention. If the man has no active disease, or if he has the type of lesion which can be cared for without a prolonged stay in a sanatorium, the conditions of the job to which he must return should be improved as much as possible, so that further injury and spread of the disease does not occur. If the patient himself cannot continue at his job, it is all the more reason why the conditions of his former employment should be looked into, lest existing conditions lead to or predispose to the development of tuberculosis in others. It is hoped that some day the patient will again be self-supporting. When such time comes, it is economically better that he return to a position with the duties of which he is familiar—one more reason why the conditions of his former employment should have been investigated.

This leads to the problem of rehabilitation. Rehabilitation is an integral part of any tuberculosis endeavour and should be closely linked up with the clinical side. Therefore the tuberculosis clinic staff should assume the responsibility of

overseeing such undertakings. A full discussion of the rehabilitation problem cannot be entered into now. The subject is so large that it warrants a separate article.

Diagnosis alone is not sufficient—the value of continuity of observation cannot be overestimated. Such observation should extend over the lifetime of the individual and beyond that to the lifetime of his children. “It has been possible in this way to follow the alternating expressions of tuberculous infection in the same individual from childhood through the intervening years to old age,” for, as Pettit has said, “The man who has learnt to care for his tuberculosis lives out the natural span of his life.” Therefore, not only must the clinic diagnose the presence of a tuberculous lesion, but it must follow up that diagnosis and make certain that the individual “learns to care for his tuberculosis”. Tuberculosis is a “familial” disease. Diagnosis in one member of the family necessitates examination of every member of that family. In refractory cases, where the remaining members of the family do not come to the clinic of their own accord or upon the solicitation of the visiting nurse, the clinic physician should make it a rule to visit the home in person and explain the necessity of such examination. Where tuberculosis is a Department of Health concern, the threat of quarantine may be useful both to assist in hospitalization of the patient and in obtaining examination of the remaining members of the family.

“It is to the properly organized Dispensary (clinic) that we should look for further contributions to our knowledge regarding the natural history of tuberculosis from initial infection through study of the infinitely various phases of tuberculization in different individuals”. Study and research, integral parts of clinic life, are equally or more important than diagnosis itself. Nowhere else, in a given locality can such wealth of material be found for study and research as in the properly conducted and staffed clinic. The present day attitude of many clinic boards seems to compare with the remark of an honoured professor of medicine at Edinburgh, when told by Sir Robert Philip, in 1883, that he intended to devote especial attention to tuberculosis. This professor’s remark was “Don’t think of such a thing. Phthisis is worn to a thin thread. The subject is exhausted.” Yet to-day, fifty years later, every country has a special journal devoted to tuberculosis and, in addition, hardly an issue of any of the foremost medical journals is without

at least one article dealing with this disease. Such an expenditure of money and specialists’ time is not being made wantonly. “Where there is smoke, there is fire.” Where so much controversy exists definite knowledge must be lacking. The study of tuberculosis must be commenced in the clinic and followed up through the hospital, sanatorium and rehabilitation centre. The clinic staff is given the Alpha and Omega of the problem.

“Because of its great value as a field for *continuous* scientific observation, it is much to be regretted that the conduct of those centres is so frequently relegated to inexperienced and often temporary officers. Thus it comes about that the Dispensary, which ought, in fact, to be the organic “nodus” and co-ordinating centre of all tuberculosis activities of the area has been frequently degraded to the position of an indifferent outpatients’ department.”¹ A properly qualified, full-time, permanent staff must be the rule. Political or other upheavals should not influence the smooth progress of the clinic. Chest clinics throughout the country are staffed by men from the senior staff of the adjacent sanatoria. This practice has not arisen because these men had to be employed, but because it was recognized that only in the sanatorium could a proper training and insight into tuberculosis be obtained. Personally, I feel that one year of sanatorium residence should be a primary qualification required of even the most junior clinic staff member.

The governing body, the Board of Directors of the Clinic, should be non-partisan, public-spirited, fully representative of people, government and medical profession. Full cooperation must exist between this Board and the director of the Clinic. Unless such cooperation does exist harmony within the clinic cannot result. Unless the governing body is composed of open-minded men and women, the need for research may not be seen, nor can contact with the finance producing sources be established. Unless such contact is established facilities for both study and research cannot be provided. Study and research require both time and money, sufficient help in the clinic to permit of leisure for study, sufficient money to provide the necessary equipment. Research is not a thing of immediate results. Results are often slow in appearance, and even on appearance they often seem infinitesimal compared to the cost. However small the results, the value remains. “Little by little” is always the watchword. A little from this clinic added to a little from elsewhere builds up

the picture—cooperation not only within the clinic itself, but co-endeavour with like clinics and sanatoria elsewhere.

The individual patient who presents himself for examination is only a minor factor. Statistics show that only 10 per cent of patients with tuberculosis voluntarily go to the clinic or to the private physician for examination. Therefore, for every patient who presents himself at the clinic there are nine more who must be sought out. The clinic must not be cemented to its diagnostic centre. A mobile field force must be maintained and every possible contact brought in for examination. Not only must this field force hunt down the "suspect" but it must also follow up every patient examined in the clinic. If a diagnosis of tuberculosis, or suspected tuberculosis, has been made, admission to the sanatorium or treatment centre must be arranged or, in the case of the suspect, the patient must be brought in for re-examination at the stated interval. If you tell the patient to come back on a certain day, and rely upon that request alone, you will find that you have several vacant spaces on your calendar when that day comes. Responsibility for the re-examination of these people must, then, rest upon the field force.

If there is any cause, however slight, to suspect tuberculosis in a patient that patient must not be lost track of. As an instance the following case may be cited:—H. H. C., examined two years ago. At that examination, physical examination did not reveal any distinct evidence of disease. The x-ray film, however, did show a small focus, which was considered quiescent. No follow-up was made. Recently, this patient returned to the clinic. There is now a far advanced, bilateral tuberculosis. It is too late for any active treatment. All that can be done is to isolate him in the sanatorium and prevent a further scattering of infection to others. Had this patient been followed through the intervening period the opportunity for active treatment, with its chance of saving life, would not have been lost. The death of this one patient, however unfortunate, is not the most depressing factor. He had been employed in a green grocer's. Lettuce, celery, etc., are not cooked before being eaten. The patient continued to work until too weak to stand up. How many others have ingested tubercle bacilli and developed the disease as a result of our neglect of this one case?

Whenever one member of the family develops tuberculosis all the remaining members of the

family should be examined, whether they are ill or presumably healthy. Not only must the presence of active disease be discovered, but by examination of the older members of the family the source of infection may be located. What has been referred to as "Grandmother's bronchitis" is often, only too often, discovered to be chronic fibroid phthisis—in other words TUBERCULOSIS.

Many physicians and nurses look upon history-taking as somewhat of a waste of time and something to be glossed over as rapidly as possible, filling in one or two blanks upon the chart, following a set routine, and never deviating from that routine in any individual case. Every history should be searching, most especially in the case of tuberculosis. No clue, however slight, should be overlooked in the endeavour to locate the source of infection. We may look through our files again for an instance covering this factor. A young mother has had a "summer cough" for three or four years. Finally the cough becomes so aggravated that she is forced to seek relief. Examination reveals a moderately advanced tuberculous process in the apex of both lungs. She tells us she has never been in contact with tuberculosis, but on further questioning she remembers that she lived with a girl, some five years ago, who had a cough and had "pleurisy". But "she never had tuberculosis". In this case, luckily, we are able to locate the girl referred to, and we find that she entered the sanatorium a month or two after the time referred to above. Search out that room-mate or friend. Have him or her examined. That is part and parcel of the field force's duty. Therein may be located the source of infection. The medical staff of the clinic must be no less keen. Personal inspection by the physician of the dwelling or place of occupation may reveal conditions likely to maintain or propagate the disease.

So much for the "contact case". There remains a much larger field of duty for the field force, the systematic search for tuberculosis. Every child in the community should be examined on entering school, on entering High School, on entrance to and on leaving the University. Four complete physical examinations and four x-ray films for each individual in the community, the cheapest insurance in the world. If possible a fifth examination should be added at birth. These five examinations are not complete without an intradermal O. T. test.

But all of our children will not proceed to the

university. Many must leave school and go to work, some before completing the High School course. The child in industry has a much greater drain upon his health reserve than has the child in school. Routine yearly examinations here should be the rule. Health Insurance Companies advocate such examinations to all of their policy holders. This procedure should be universal, and if the habit is formed in adolescence, it will be followed throughout life. One month of illness causes an economic loss equivalent to the cost of thirty complete examinations. Unless the parents are educated to the necessity of these frequent examinations they will not send the children to be examined, nor will they be able to understand the necessity of the financial outlay which must be met in this work. The consent of the parents must be obtained before any tests can be carried out on the children. The routine examination of the children may be looked upon as belonging to the medical department of schools. But in our fight against tuberculosis, specialists in that disease, and especially in tuberculosis of children, should be the ones to make such examinations as outlined above. The School medical department has sufficient to do to undertake the routine yearly examination, from the pædiatric standpoint, without being expected to make an examination which calls for the services of a specially trained physician. Therefore, this particular phase of the work belongs to the field force of the clinic, and the examining should be part of the duties of the clinic physicians, or that member of the clinic medical staff who has been specially trained in Tuberculosis of Childhood.

To round out the clinic program, it is essential that facilities be available for observation and treatment. The clinic staff should have access to, and control over, a treatment centre sufficiently large to permit them to observe "suspect cases" over a period of not less than thirty days, and to carry out such immediate treatment as is indicated as soon as the diagnosis of tuberculosis has been made. Ideally, the patient should be followed by the clinic staff from the day of

diagnosis until complete arrest of the disease in the patient has been obtained. This may not be feasible owing to the number of patients, but the instituting of treatment can remain with the clinic staff and such additional training will enhance the value of the medical staff to the clinic. It will also permit the members of the staff to enlarge their knowledge of the disease. The man who diagnoses disease but does not treat soon becomes stale and wearied of his task. Let the diagnostician round out his day by observing the progress of the disease in those whom he has diagnosed and his interest will be sustained. The building of the machine is only half of the fun. Seeing it work, seeing its faults, and seeing how it may be improved teaches us how to make a better machine. So it is with diagnosis. Unless we can see our mistakes, we do not learn. We can only learn by observing those, whom we have diagnosed, over the period of their "cure".

I referred to personal inspection of homes and place of employment. So long as we have tuberculosis a certain amount of home treatment will be necessary. Unless the clinic physicians follow their patients into the home they cannot intelligently prescribe home treatment. Therefore every clinic physician should be required to undertake some part of the home treatment of cases. His knowledge of the conditions under which these patients live will enlarge his perception of the disease, and he will see more clearly the steps necessary for the eradication of the disease.

To sum up, the medical staff of the clinic should be responsible for: (a) diagnosis; (b) immediate treatment; (c) home treatment; (d) rehabilitation; (e) research.

The nursing staff should undertake: (a) follow-up work of contacts, home treatment, discharged patients; (b) a systematic search for tuberculosis patients and suspects; (c) the admission of patients to the sanatorium or treatment centre.

REFERENCE

1. PHILIP, SIR R., *Am. Rev. of Tuberculosis*, 1932, 26: 637.

HEPATOLENTICULAR DEGENERATION.—Gardberg presents in detail the history of a case of hepatolenticular degeneration, in which the hepatic portion of the clinical picture predominated, whereas in most of the reported cases the nervous manifestations have been the more pronounced. The pathological observations were typical of hepatolenticular degeneration, of which Wilson's disease is one form. The liver was an excellent example of advanced atrophic cirrhosis. The spleen was greatly

enlarged, was slate blue, and its capsule was smooth and glistening. On section, the splenic pulp was a deep purplish red and very friable. When the skull was opened, considerable oedema was found. The ventricles were found to contain a slightly increased amount of fluid. Sections through the columni and lenticular regions of the brain showed a marked increase in glial cells and fat droplet cells. The only other abnormal condition was an acute congestion of the pulmonary alveoli.—*J. Am. M. Ass.*, 1933, 100: 482.

Case Reports

ALMOST TOTAL THYROIDECTOMY FOLLOWED BY HYPOPARATHYROIDISM

By E. H. Wood, M.B., F.A.C.S.,

Ottawa

The patient, a girl of 18, was admitted to hospital on February 16, 1932. Her history was that of having been acutely ill for over two years. The last 20 months had been spent in bed. She was able to be up and about for short intervals, but this aggravated her symptoms and, latterly, on her physician's advice, she had spent practically all the time on her back. During this period she received the usual medical treatment for her condition. Her symptoms were those of severe hyperthyroidism.

On physical examination, she presented all the textbook signs. The exophthalmos and tremor were most marked. When first seen in hospital her pulse was 140; temperature 99°; weight 119 lbs.; basal metabolic rate + 58; hæmoglobin 63 per cent; red blood cells 4,100,000.

Large doses of sedatives were required to control the nervousness, which improved but little in 3 weeks' pre-operative preparation in hospital. Lugol's solution and digitalis did not control the pulse, which varied from 100 to 140. An ice collar was kept on for two out of three hours. Hæmatinics did not improve the blood picture, which was, before operation as follows: hæmoglobin 55 per cent; red blood cells 4,124,000. However the basal metabolic rate came down to + 18 and the weight went up 2 lbs., to 121. The basal metabolic rate had to be discounted a good deal as the patient was continuously under sedatives. The bright spot was the increase in weight, small though it was.

Operation was decided upon three weeks after admission. The pre-operative orders were as follows. March 7, 1932. Force fluids till one hour before operation. No milk after midnight; phenobarbital, gr. x 3 hours before operation; morphia, gr. ¼; hyoscine, gr. 1/100, hypodermically, half an hour before operation.

Operation was performed at 9 a.m. under local anæsthesia—nupercaine 1/1000 solution. A subtotal thyroidectomy was done. The gland was

very cellular, and as pre-operative control was most difficult nearly all the gland was removed, there being left only a piece about the size and thickness of a 25 cent piece on each side. The isthmus was completely removed. The pulse was 120 at 8 a.m. before the patient was taken from her bed. It was 122 on returning to bed and 126 at 4 p.m. that same day. It came gradually down (never going above this). On the fifth day after operation it was 86 and remained down throughout her stay in hospital. The temperature went to 102.3° the first day after operation, was normal on the fifth and remained so, with periodical slight elevations to 99.2°.

During the operation there was no increase in excitement or upset of any kind, except that the blood pressure rose from 140 to 210. This was but for a few minutes during the dislocation of the gland.

At the time of operation nothing was seen of the parathyroid on the left side. On the right however one of these glands was seen to be dislocated from its bed of fat. The blood supply seemed satisfactory and it was returned to its bed, and gently covered with a little fat sutured to hold it in place.

All went well till the ninth day after operation when the patient presented the syndrome of acute hypoparathyroidism. There was no rise in pulse or temperature. There was a marked spasticity and irritability of all the muscles. Co-ordinate motion was almost impossible. She could not speak. Tetany was severe. She was immediately given 2 drachms of powdered calcium lactate dissolved in two glasses of water. Within less than two hours the patient appeared normal. However there was a good deal of muscular irritability which persisted for three weeks, gradually subsiding. During this three weeks she had occasional attacks of tetany which were transient and controlled by increasing the dosage of calcium lactate. She received from ½ to 1 drachm of the calcium lactate three to four times a day, always thoroughly dissolved in water, and increased beyond this if spasm occurred. She was also given irradiated ergosterol during this time. Blood calcium tests taken the day before

and the day of a mild attack of twitching and spasticity showed respectively 23 and 21.5 mgrm. per 100 c.c. of plasma. These tests were done by two different men working in different laboratories. This is very high and seems to indicate that the calcium lactate certainly was being absorbed, but that there was not enough parathyroid secretion to mobilize it for use in the tissues. Blood phosphorus estimations were not done. From recent research it is suggested that the symptoms in this case may have been to some extent due to an increase in the phosphorus. During this period of three weeks after operation her progress was otherwise normal. Appetite and bowels normal; gaining strength, and the pulse and temperature normal. She was discharged on April 2, 27 days after operation. She took calcium lactate and ergosterol till July. The dosage was gradually decreased. There was no further tetany.

Ten months after the operation her weight is 129 lbs. The exophthalmos has improved but persists. Pulse 70; temperature 97.8°. There is no tremor or muscular spasticity. She complains of occasional slight palpitation. The heart appears normal. Hæmoglobin 94 per cent; red blood cells 5,352,000; white blood cells 9,100. Blood calcium 10.8 mgrm. per c.c. (normal) of serum. Basal metabolic rate -18.

The interesting points brought out by this case are: (1) the futility of prolonged medical treatment in severe hyperthyroidism; (2) the value of an increase in weight, however slight, as an indication of a favourable operative risk; (3) that local anæsthesia can be used satisfactorily even in the more nervous patients; (4) should a dislocated parathyroid be returned to its bed or imbedded in the sterno-mastoid muscles? (Under similar circumstances again I shall put the parathyroid into the muscle); (5) the value of calcium lactate dissolved in water in the control of acute hypoparathyroid symptoms. (I am unable to estimate the part played by irradiated ergosterol, but suggest that it is of sufficient value to justify its use); (6) the indication for and satisfactory results of almost total thyroidectomy in suitable cases. It is too soon to state that there will not be hypertrophy of the residual thyroid tissue.

This case was referred by Dr. T. G. Loudon, of Peterborough, and I am grateful to him and Dr. C. B. Waite, also of Peterborough, for the post-operative clinical and laboratory check-up respectively, and for their assistance otherwise.

A CASE OF (SUCCESSIVE) BILATERAL ARTIFICIAL PNEUMOTHORAX*

BY ALLEN TEMPLE, M.D.,

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Bilateral pneumothorax is still of sufficient rarity in the literature to indicate that its induction is not undertaken without careful consideration. This applies more particularly to cases in which both lungs are collapsed at the same time. When one lung is collapsed after the other has been allowed to re-expand the results are generally more satisfactory. The following case is presented as an example of this type.

The patient was first seen at the Pulmonary Clinic, Royal Victoria Hospital, on June 28, 1926. She was then 14 years of age. She had been ill for three weeks, with cough, expectoration, night sweats, fever (up to 101° F.), and pain in the chest and abdomen. The onset was sudden. She had lost three pounds in three weeks.

Past history.—She had had measles and pertussis in infancy, and was in the Royal Victoria Hospital for three weeks in 1923, with a diagnosis of orthostatic albuminuria, after which she was followed in the cardiorenal outdoor clinic until the albuminuria gradually cleared up. She had been subject to frequent "colds" since infancy. For two and a half years she had suffered from pain in the chest and abdomen after exertion.

Family history.—Three members of her mother's family had tuberculosis (two dead). There was no history of direct contact with the patient.

Physical examination.—Temperature 101° F. Weight 90 pounds. The upper third of the right lung showed impaired resonance, harsh breath sounds, increased vocal fremitus and resonance, and numerous crepitations. The remainder of the lung fields was clear to physical examination. The sputum was negative for acid-fast bacilli. The x-ray report was, "old and recent tuberculosis in upper half of right lung. Left lung is negative."

Right pneumothorax was started on July 2, 1926. The initial pressures were - 16, - 6, amount 300 c.c.; final pressures - 7 - 4. At her

* From the Medico-Surgical Pulmonary Clinic, Royal Victoria Hospital, Montreal.

third refill, July 12, initial pressures were - 8 - 4, amount 500 c.c.; final pressures - 2 + 1. Fluoroscopy showed complete collapse of right lung, with an adhesion at the apex. She then went to a sanatorium, where she remained until January, 1927. During this time, refills of approximately 600 c.c. were given every two weeks.

She returned to the clinic on January 17, 1927, with no cough or expectoration. Temperature normal. Weight 91 pounds. A refill was given; initial pressures - 14 - 8, amount 800 c.c.; final pressures - 5 - 3. Fluoroscopy showed 75 per cent collapse. After this she went to Los Angeles, where she remained until early in 1929. During this time she was free from symptoms, except for periodic attacks of cough with expectoration. During the last year of her stay there she did not cough at all. The pneumothorax was kept up until March, 1929, when it was either lost or discontinued, and the patient was told she was "all right."

She appeared at the clinic again on June 17, 1929, a few weeks after her return from California. Temperature 99.4°; weight 95 pounds. (She was then 17 years of age). Cough and expectoration, which had been absent for over a year, had returned two weeks previously.

Examination showed:— right lung—diminished percussion note and increased vocal resonance over the upper lobe; no râles. Left lung—fine crepitant and sibilant râles over the upper two-thirds. The sputum was positive (Gaffky VII).

X-ray report:— "Small pneumothorax at the right apex, with appearance of fibroid tuberculosis in the right upper lobe. Mottling, and a ring shadow, in the upper third of the left lung."

Left pneumothorax was started on July 5, 1929; initial pressures - 10 - 6, amount 300 c.c.; final pressures - 6 - 3. Fluoroscopy after the third refill showed 75 per cent collapse, but this was never attained again. For the next three years the collapse varied between 30 and 50 per cent.

On September 6, 1929, cough and expectoration had ceased, and her weight had gone up to 104 pounds. Shortly after that, she attempted suicide by inhaling illuminating gas, and was in hospital for five days. Except for slight cyanosis, she showed no ill effects whatever at her next visit to the clinic, or subsequently. In October the interval between refills was increased

from one week to two weeks. From then on she had a refill every two weeks until the end of 1932, when she herself increased the interval. Initial pressures averaged - 8 - 6; the average amount was 500 c.c.; and final pressures averaged - 5 - 1. She complained of delayed pain every time the pressure was raised to zero. Fluoroscopy showed a collapse which was always between 30 and 50 per cent. Her weight slowly rose to 116-117 pounds. X-ray reports: August 15, 1930, "Many calcified spots and fibrotic markings in the right lung, apex to 8th rib. Pneumothorax 40 per cent left."

February 15, 1932, "Left apex is completely collapsed to 5th rib, and from there to base there is 10 to 50 per cent collapse." In November, 1932, the patient began to insist that two weeks was an inconvenient interval for her, and in spite of persuasion she came every three weeks, and sometimes only once a month. It soon became apparent that the pleural cavity was becoming obliterated. The collapse dropped to marginal, in spite of increased pressures. On April 25, 1933, it was impossible to find a pleural space at all at the usual site (6th space). Finally free fluctuations were obtained in the 3rd space, and 450 c.c. of air were given, with pressures of - 10, - 5, - 3 - 0. Fluoroscopic reading was "20 per cent collapse at apex, with basal adhesions."

Present condition. — Temperature normal; pulse 80-90; weight 116. She has had only occasional cough for the past three years, with no expectoration and feels perfectly well. For the past year she has been working as an assistant in a shop. Percussion note is impaired over the upper third of both lungs, with slightly increased vocal resonance. No râles.

COMMENT

It is possible that if the original right-sided pneumothorax had been continued it might have prevented the spread in the left lung. On the other hand, it is highly probable that there was a gradual obliteration of the pleural space, as occurred later on the left.

The future procedure will be shortening the intervals between refills and an attempt to induce higher pressures, in the hope of breaking down the adhesions, since they are totally unsuitable for cauterization. If this fails to maintain the pneumothorax, there are two courses to be considered: (1) phrenicectomy, and allow

the lung to re-expand, possibly attempting to maintain the apical collapse; (2) to replace the apical pneumothorax with an oleothorax.

It might be argued that now, with the patient in good condition, is the time to do a thoracoplasty. But she has been clinically well for three years, with one year of moderately hard work. If she is kept under careful observation and does not submit herself to excessive strain there would seem to be no reason why her present condition should not continue indefinitely.

My thanks are due to Dr. J. L. D. Mason for permission to report this case.

HÆMATURIA COMPLICATING A CASE OF TYPHOID FEVER

By L. C. MONTGOMERY,

Montreal

The onset of typhoid fever is usually insidious, but it may commence in a variety of ways. In Osler's "Principles and Practice of Medicine," the following are listed:— Onset with pronounced, sometimes sudden, nervous manifestations (delirium, meningeal symptoms, convulsions); with pronounced pulmonary symptoms (marked bronchitis, chills and pain in chest); with gastro-intestinal symptoms; with symptoms of acute nephritis (smoky and bloody urine, albumin and casts); ambulatory form.

The case I wish to present is a male, aged 52, who was admitted to the Montreal General Hospital, in the service of Dr. R. E. Powell, with the following complaints: blood in the urine; sore throat; loss of appetite and weight; nose-bleeding; fever for 12 days prior to admission.

Family history.—Negative.

Personal history.—Two antityphoid inoculations at weekly intervals had been given in 1927. He was a travelling auditor for the C.P.R. Three weeks prior to admission he spent a week in Three Rivers, and two weeks prior to admission was in Ste. Anne de Bellevue for two days.

Present illness.—He was admitted on account of hæmaturia and dysuria, which had been present off and on since 1917 and was gradually becoming worse. Ten days prior to admission he developed an acute sore throat with swollen and painful cervical glands. His wife stated that he was actually delirious at times. His throat was still painful at the time of admission

to the hospital. Temperature 101°; pulse 114; respirations 24.

He was cystoscoped on the day of admission and a medium-sized encrusted stone was found in the bladder. Otherwise examination of the genito-urinary tract did not reveal any abnormal condition, sufficient to account for this elevated temperature.

Examination.—Examination on the twelfth day of his illness showed a sick-looking, poorly nourished and badly developed man. The pulse was 116 per minute; respirations 24 per minute; blood pressure 170/100. The pupils were equal and active. No rigidity of neck. The tongue was clean, red and dry; throat red and dry; no exudate present. Artificial teeth. A few "shotty" cervical glands. Thyroid normal. Chest negative. The abdomen was rounded and moved freely with respirations. An indefinite sense of resistance was noted in the upper half, with slight tenderness. The liver was not palpable. There was an indefinite mass deep in the left upper quadrant of the abdomen. One could not be certain that this was an enlarged spleen, but the area of splenic dullness was increased to percussion. The flanks were clear. No rose spots or other rash. The knee-jerks were present and equal; no pathological reflexes were found; no Kernig's sign. Fundi negative.

The impression at this time was that there did not seem to be sufficient trouble in either the throat or tonsils to account for the elevated temperature. The possibility of the palpable mass in the left upper quadrant of the abdomen being a peri-nephritic abscess was considered. A blood count was done, which showed red blood cells 4,490,000; white blood cells 4,900; hæmoglobin 85 per cent (Sahli). Polymorphonuclears 60 per cent; lymphocytes 33 per cent; monocytes 6 per cent; eosinophiles 1 per cent. A Widal test on the twelfth day of his illness showed a positive agglutination for *B. typhosus* in dilutions up to 1/1000. It was recalled, however, that he had had two antityphoid inoculations in 1927. A bile culture was also taken, and a specimen of urine and stool sent to the bacteriological laboratory for culture. These were reported as negative for *B. typhosus* at the end of five days.

During the next four days the patient continued to run an irregular type of fever varying between 99.4° and 103° F., with a pulse hover-

ing between 96 and 120 per minute. His tongue remained unusually clean, and he was quite bright and alert. When one went into his room, he was usually found in the semi-recumbent position reading a paper. What one took to be the spleen was quite definitely enlarged, and by the fourteenth day of his illness there were several pinkish papules, suggestive of rose spots, over the lower left chest. During the next few days, similar spots appeared over the surface of the abdomen. On the seventeenth day of his illness he was transferred to the public ward service of Dr. C. A. Peters as a suspected typhoid. He continued to run a remittent type of temperature for four days, and then it gradually returned to normal by the twenty-third day. During this time his tongue remained clean, and he seemed unusually bright for a patient with typhoid fever.

On the twenty-sixth day of his illness his temperature again became elevated; he seemed toxic and listless; his tongue became coated; he complained of headache and the spleen was still palpable. By the twenty-eighth day of his illness, he was running a typical course of typhoid fever. His temperature had straightened out between 102° and 103° F., he was moderately toxic; the spleen was palpable; and there was a fresh crop of rose spots over the abdomen. For the next seven days his temperature continued elevated, then gradually began to fall and was down to normal by the forty-third day of his illness.

At the beginning of his recrudescence a specimen of stool was sent for culture, and on the thirtieth day of his illness it was reported as positive for *B. typhosus*. On the thirty-first day of his illness the Widal test for *B. typhosus* was positive in dilutions up to 1/160. At his own request, he was discharged from hospital on the forty-seventh day of his illness. Cultures of stool and urine taken at this time were reported negative for *B. typhosus*. During his stay in hospital a leucocyte count was done on fourteen different occasions. All of these showed a persistent leucopenia varying between 2,600 and 5,800 per mm.

The patient returned to Dr. Powell's service forty-five days after his discharge from hospital, and under gas-oxygen-nembutal anaesthesia, a suprapubic incision was made, and a calculus two inches in diameter was removed from the bladder. The patient made an uneventful recovery.

Summing up, we have a man 52 years of age, who had received two antityphoid inoculations in 1927, and who two and three weeks prior to the onset of his illness had spent several days in Three Rivers and Ste. Anne de Bellevue. He was admitted to hospital with a sore throat, hæmaturia, and a vesical calculus. Following admission he was found to be running a somewhat atypical course of typhoid fever. On the twenty-sixth day of his illness there was a relapse, and he then ran the typical course of a relatively mild case of typhoid fever.

Clinical and Laboratory Notes

A SIGNIFICANT SIGN IN CORONARY OCCLUSION

BY D. M. BALTZAN, M.D., C.M., F.R.C.P.(C.),

Saskatoon

We have observed in the acute cardiac catastrophies interpreted as coronary occlusion a significant feature. As is well known, the incidence of this disease is predominantly in the male. All except one of the persons in whom we have diagnosed this condition, a female, were habitual smokers of tobacco in one form or another. Before attaching any significance to the observation to be described we were impressed on several occasions by patients volunteering the statement that they had had no desire to smoke since the onset of their illness. These remarks occurred on the second and the third day of the

illness, when relief from pain followed and the anxiety-state had abated. Subsequently we watched for this statement, and now we try to obtain the patient's feeling in the matter even earlier. This is done by approaching the subject indirectly and in such manner as to elicit a voluntary expression. No attempt is made to imply in the interrogation the answer we anticipate. It is essential to have the question of smoking qualified by the following conditions. Following the onset of the acute episode the patient should find, much to his surprise, that the thought of smoking has not occurred to him. When he recalls this fact he adds with a measure of satisfaction that he has lost the taste for tobacco. Further it is observed that a patient is guarded in the return to the habit during convalescence. The reserve with which he does so parallels the respect with which he faces

extra exertion. Conversely, if after an acute episode in which a coronary accident was suspected the patient shows no disregard for this habit, we would be reluctant in an obscure case to accept the diagnosis without further reserve.

Even if all the accepted criteria are present in a given case some doubt still exists about the certainty of the diagnosis. More frequently is this so when complicating factors exist, or when the initial manifestations are gastric or abdominal in type. A current instance is the following case where very good reasons existed for the probabilities of acute pericarditis, acute apical pneumonia, congestive failure in an hypertrophied aortic heart, and, less obvious, the probability of an underlying process due to coronary thrombosis.

C., a male, aged 51, was admitted to the City Hospital on March 25, 1933, 36 hours after the onset of breathlessness, cough, præcordial distress of a short duration, rusty sputum, and cyanosis. On admission the temperature was 101° , pulse 136, respiration 36, blood pressure 134/84; leucocytes 24,900; polymorphonuclears 88 per cent. There was dyspnoea and evident cyanosis. The pulse was regular but thready. Cough required codeine. There was no substernal or præcordial pain. The heart sounds were distant, and an inconstant rub was present at the mitral area, more marked with deep respiration and change of posture. Râles were marked in the right chest, especially in the apex. The sign above described was present in its entirety. On the strength of this, more than on the other indications, a diagnosis of coronary occlusion was ventured. Subsequently the roentgenograms of the chest showed an enlarged heart with an old apical tuberculous lesion. The electrocardiogram showed marked S.T. changes in leads I and III, and a depressed diphasic lead II. The course of the disease was in conformity with the diagnosis.

One of the first, and the most dramatic case, that formed the basis for later observation of this phenomenon is as follows.

D., a male, aged 49, was suddenly taken ill on November 5, 1929. He was seized with severe epigastric distress at midnight while driving his car into his garage. He was seen shortly afterwards in very great distress and restlessness, going from bed room to bath room, trying to induce vomiting to relieve his distress. The pain settled substernally. There was no change in his pulse and no cardiac signs were elicited. An acute abdomen was tentatively ruled out, and morphine was administered. In the morning the pulse rate was 46 per minute; blood pressure, systolic 98, diastolic 50. No elevation of temperature. Leucocytes 11,000. An electrocardiogram at this time gave no assistance. At

the end of 36 hours his temperature was 100° . Repeated electrocardiograms showed R.T. changes indicative of coronary involvement. The patient had been an inveterate smoker, but now repeatedly stressed his adverse reaction to tobacco. The habit was not resumed for the remainder of his life, which was only five months.

Without repeating other typical instances, carefully observed since, it is interesting at the moment to weigh the facts of the following case.

A male, aged 61. Prostatectomy was performed on January 9, 1933. March 10, 1933, an exploratory operation on the urinary bladder was done under nitrous oxide and oxygen. This was followed by a short febrile period and he remained in bed. During the night of March 25, 1933, he was seized with a vice-like constriction in his chest. This lasted only a short time, but was sufficient to leave a definite impression. Morphine was not required. In the morning the patient was seen for the first time for this special condition. He was comfortable. The pulse was regular; for several days before the rate had been 80 per minute; now, and for three days, it was over 100, up to 110. His temperature ranged about 101° for three preceding days and continued lower since. Blood pressure was 88/63, and an earlier record before operation showed 108/60. The heart was not enlarged. An indistinct roughened systolic murmur over the mitral area became apparent in the next few days. Leucocytes 8,000. The most prominent feature was suddenly acquired distaste for smoking. This to him was an amazing experience, and he delighted in continually reminding us of the fact. The electrocardiogram showed low voltage in all leads, marked notching of Q.R.S.2 and Q.R.S.3; the R.T. intervals were not changed, the Q.R.S. intervals were not over 0.1 second, and no gross degree of arborization defect could be interpreted. The outstanding feature in this case was the loss of taste for tobacco. Here we are faced for the first time with this sign assuming the major rôle. If it can be used as one of the criteria for diagnosis of a coronary accident we will have gained much. Its importance can only be established by more extensive observation. Here it was tested in a limited number of private patients. It is offered on this basis only, and for the purpose of exciting comment on the fact or otherwise of the coincidence of the phenomenon in a larger number of cases.

For two cases herein referred to I acknowledge the privilege with thanks to Dr. E. R. Myers (case demonstrated before the hospital staff) and Dr. E. Landa; also to Dr. A. Hazell, who has helped observe our own cases closely (one case not here described was presented before the staff).

Editorial

THE EARLY DIAGNOSIS OF CANCER

WITH this issue the *Journal* is beginning the publication of a series of articles designed to place before the profession in a simple, clear, and concise way all the pertinent facts that make for the early diagnosis of cancer of the various organs. The first article of the series is by Dr. D. E. H. Cleveland, of Vancouver, on "Cancer of the Skin," and he will be followed by other well-known authorities. The value of such a presentation will be admitted by all; the prevention and cure of cancer are among the most urgent problems before the profession to-day.

In the light of all that is being said and written about this subject it seems platitudinous to assert that cancer is increasing and that something ought to be done about it. Nevertheless, this statement needs reiterating and pressing home. Reliable statistics in regard to cancer date, in the United States, from 1900, when the Registration Area for Deaths was established. In that year the crude death rate from cancer was 63 per 100,000; in 1920 it was 83.4; in 1929 it was 96.1, an increase over the crude death rate of 1900 of nearly 52.5 per cent. So far as Canada is concerned we may quote Dr. F. N. G. Starr, who, in a paper read at the Annual Meeting of our Association this year at Saint John, stated that during 1931 there were 9,578 deaths from cancer, or a rate of 92.4 for every 100,000 of the population. Whether the increasing number of deaths from cancer is merely statistical or represents the actual state of affairs has been and still is being debated. Some would explain it on the basis of better diagnosis and more accurate records, and because more people, owing to the better control of infectious disease, now reach the cancer age. It is beside our purpose to discuss this point at the moment. Suffice it to say now that in thirty years cancer as a cause of death has moved in our statistical tables from fifth place to second, being surpassed only by heart disease. This being the case, it behoves us to take effective action, being reasonable beings.

It is also platitudinous to say that, in spite of years of elaborate research, the cause of cancer still eludes us. But, even if the cause were discovered it is by no means certain that the way would be pointed to a specific cure. Probably, for many years to come, and certainly for the present, we have to rely on the resources provided by surgery and radiology, which, happily, were never greater than they are at the present day. But both surgeons and radiologists agree that they could do much more if cases reached them earlier. The crux of the position, therefore, lies in Earlier Diagnosis.

There are many reasons why cancer is not diagnosed earlier than it is. For one thing, people are not likely to consult a doctor until they begin to suffer, and cancer not infrequently begins and develops up to a point without causing pain or any disturbance of function. Then, there is the tendency, inherent in most people, to avoid facing an issue, more particularly if that issue is terrifying. This being so, the sufferer from cancer is apt to delay, and he, too often, presents himself before his medical adviser when it is already too late. Even if the patient presents himself or herself in good time the medical man may, from inexperience in cancer cases (for few men in general practice will likely see many cases of cancer in the course of a year) may fail to diagnose correctly the condition, or, if in doubt, may elect to temporize. The policy of "Wait and See" in this matter is apt to be fatal. All medical men should familiarize themselves with the common manifestations of cancer, with the methods of examination and diagnosis, and the recognized lines of treatment, and utilize this knowledge. In the case of "lumps", ulcers that will not heal, enlarged glands, hæmoptysis, hæmaturia, obstinate constipation, discharges at unwonted times or from unwonted places, the medical man consulted should ask himself the question—"Can this be cancer?", and should not rest content until he has answered it, one way or the other. His patient is

entitled to this. In short, both the patient and the doctor should become "cancer-conscious" nor need this attitude of mind imply "cancerophobia". In this matter the general public require to be educated, the medical man, to be reminded.

The diagnosis of malignant disease depends on the appraisal of several factors—a carefully taken history, the findings on physical examination, perhaps with the use of various instruments of precision, chemical and physiological tests, and the x-ray. The diagnosis may sometimes be made with ease; sometimes it requires the collaboration of clinician, the pathologist, the laboratory expert, the radiologist and the surgeon. So long as doubt remains no form of examination should be omitted which is necessary to resolve that doubt. It is important to note, too, that all manipulations should be of the gentlest and not continued or repeated longer than absolutely necessary, so as to avoid launching cancer cells into the lymphatic or blood circulation. Where biopsy is to be undertaken a portion of the growth, taken radially from the centre, and including normal tissue, may be removed. Opinions differ as to the safety of this procedure, but probably any risk of causing metastasis may be avoided by the use of a cautery knife. Here, again, manipulation should be gentle.

A tumour should be examined visually and by palpation, so as to determine its consistency, extent, and its relation to the surrounding tissues. As most malignant tumours are opaque, transillumination may be of assistance. Tumours or ulcers near one of the openings of the body, or in an accessible hollow cavity, should be examined with the eye, the finger, the post-nasal mirror, rhinoscope, bronchoscope, oesophagoscope, sigmoidoscope, proctoscope, or cystoscope, as occasion may require. When any

material, solid or liquid, can be obtained from a suspected lesion it should be examined with a microscope. In the case of the stomach and intestines examination with the x-ray is imperative, for a diagnosis nowadays can be made with great accuracy by roentgenology, with the assistance of appropriate chemical tests.

No doubt all medical men, when they leave college, are well grounded in the signs of malignancy, but unless they are seeing cases of cancer constantly are certain to become "rusty". It would be of advantage for all those who are not teachers or attached to large hospitals to jot down on pieces of card the cardinal symptoms, signs, and characteristics of cancer of the various organs. Such information could be compiled from the articles on the early diagnosis of cancer which are appearing in our *Journal*, and be filed away for ready reference. Then, all medical men would do well to visit from time to time cancer centres, cancer clinics, and large hospitals, so that they may familiarize themselves with the appearances of cancer and the advances that are being made in the control of malignant disease. In view of the importance of the matter, this should be regarded as an imperative duty. The early diagnosis of cancer might be given more prominence in our medical societies, and might very well take up some of the attention of the lecturers in the post-graduate tours being sponsored by our Association. Determined and persistent action, somewhat along the lines suggested here, could hardly fail to produce improved results. Finally, it should be remembered that while early diagnosis of cancer is of prime importance, it will be of little avail unless followed up by the prompt application of appropriate and modern methods of treatment.

A. G. N.

EPIDEMIC ENCEPHALITIS

ENCEPHALITIS is a term which has become familiar to the profession since the widespread epidemic which visited this country in 1919, with recrudescences during the immediately succeeding years. The serious outbreak which has recently visited St. Louis has again brought the subject to

the fore. The mistake must not be made, however, of supposing that all conditions to which the name of epidemic encephalitis is attached are necessarily the same disease. It would appear from the peculiar symptomatology, from the characteristic sequelæ, and, in particular, from the specialized distri-

bution of the lesions in the mid-brain and basal ganglia with immunity of the cerebral cortex, that epidemic lethargic encephalitis, or Economo's disease, is a definite entity. In the years which have elapsed since the epidemic of true lethargic encephalitis another form of acute encephalitis has made its appearance in many parts of the world. This is known as acute disseminated encephalomyelitis, and it may be subdivided into three groups: (1) post-vaccinal encephalitis following small-pox vaccination in children; (2) encephalitis following certain infectious fevers, of which measles is by far the most important; and (3) spontaneous cases of acute disseminated encephalomyelitis. This last forms much the largest group, and the cases are often incorrectly diagnosed as belonging to the true lethargic type, all the more so as they commonly occur in mild epidemic form.

Most of the cases of spontaneous acute disseminated encephalomyelitis occur in the winter months, particularly at the beginning of the year. The affection is characterized by an acute onset with fever in children, but often afebrile in adults. The symptoms point to widespread involvement of the central nervous system, and may develop as a series of acute attacks spread over the course of several weeks in a manner which is highly characteristic. The mortality is low and recovery is usually rapid and complete. In children the symptoms are mainly cerebral; in adults they are mainly spinal, but the picture is nearly always mixed. The cerebral type is marked by convulsions and meningeal symptoms. In the spinal type sharp and even severe pains in the trunk and legs are often an early manifestation, paræsthesias (feeling of pins and needles) are common, and motor weakness amounting to definite palsy may develop early in the disease. The cranial nerves are seldom involved and diplopia is rare, in sharp contrast to lethargic encephalitis. The cerebrospinal fluid does not show constant changes; in some cases there is a moderate lymphocytosis, whilst in others the fluid is normal. As in the other two forms of disseminated encephalomyelitis, the essential lesion is a perivascular demyelination; areas in which the myelin sheaths of the nerve fibres have been destroyed are

scattered widely throughout the brain and spinal cord in a manner closely resembling the picture of acute disseminated sclerosis. Perivascular cell infiltration is common, but it may be absent. It takes the form of a broad zone of cells which extends for some distance into the surrounding brain substance, thus differing sharply from the compact collar of cells which surrounds the vessels in lethargic encephalitis. The lesions are most pronounced in the pons, medulla and the lumbar region of the cord.

The principal features of the St. Louis outbreak will be found summarized by Leake in a recent number of the *Journal of the American Medical Association*.¹ At the date of writing (September 16, 1933) there had been 656 cases, with 115 deaths. The incubation period appears to be about one week. The onset is sudden with high fever. There is some degree of meningeal involvement in practically all the cases, as evidenced by headache and stiffness of the neck. In distinction to the lethargic form marked somnolence is uncommon, but the patient may become sluggish and apathetic, and may finally sink into stupor. Sometimes there is active delirium in place of apathy, and convulsions are not uncommon. Paralyzes may occur, but are only transient. The respect in which the disease differs most strikingly from the lethargic form is the remarkable absence of oculomotor palsies, so that the ptosis, strabismus and diplopia so characteristic of the 1919 epidemic are not encountered. Tremors are frequent, as also is a Babinski sign, and there may be pains in the abdomen and legs, especially in the early stages. Gastro-intestinal symptoms may be added to the cerebral, and vomiting is frequent. There is usually a leucocytosis of 15,000 to 20,000. The cerebrospinal fluid is clear, under increased pressure, and shows a lymphocytosis which averages about 100, but which may be as high as 500. The distribution of the lesions differs from that of lethargic encephalitis, for they are found at higher levels, and there is no special localization in the mid-brain and basal ganglia. Cortical lesions are common, whereas these are practically unknown in the lethargic variety. A striking feature is

1. LEAKE, J. P., Encephalitis in St. Louis, *J. Am. M. Ass.*, 1933, 101: 928.

the high mortality in the older age-groups as compared with the younger. Thus in the group above 55 years of age the mortality was 30 per cent, whereas in that from 15 to 34 years it was only 3 per cent. The case incidence is also higher amongst older persons. Recovery, when it occurs, is prompt and complete. So far no sequelæ have been observed, but, of course, the period which has elapsed is still too short to justify any conclusions in this regard.

The cause of the disease is unknown, but that is true of the other forms of acute non-suppurative encephalitis. It seems probable that the etiological agent is a filter-passing virus. The mode of transmission is also unknown. For this reason it is difficult to determine what are the best measures for preventing the spread of the disease. At present the same precautions are being used as in the case of poliomyelitis, namely, isolation for three weeks and screening the patients. It is probable that carriers are more dangerous than those actually suffering from the disease. So far the outbreak has been remarkably localized to the city of St. Louis and St. Louis County. Various therapeutic measures have been employed for the relief of symptoms, but no specific treatment is known.

The question arises as to the relationship of the various forms of acute non-suppurative encephalitis, which may or may not appear in epidemic form. Are lethargic encephalitis, acute disseminated encephalomyelitis, and the St. Louis encephalitis, which has been provisionally named encephalitis B, different disease entities, or are they merely varying manifestations of the same infection? It is curiously difficult to answer this question with any degree of assurance. There are two reasons for this. First, we are ignorant of the etiological agent in all three diseases, nor have we any laboratory test which might

enable us to separate them from one another. The finding of the tubercle bacillus in the varied lesions of tuberculosis, the presence of a positive Wassermann test in the protean manifestations of syphilis, render it easy to establish the unity of these diseases. In poliomyelitis the presence of a specific virus in the spinal cord can be demonstrated by its effect on the monkey. In encephalitis we have no such assistance. The changes in the cerebrospinal fluid are variable and non-specific. In the second place the inflammatory lesions in the various types of encephalitis do not differ materially from one another. The brain reacts to many irritants in a non-specific manner by the formation of chronic inflammatory cells, usually perivascular in distribution. Similar lesions are found in cerebrospinal syphilis, in African sleeping sickness (trypanosomiasis), and even in the neighbourhood of a brain abscess. The distribution of the lesions is undoubtedly of some assistance, a matter to which reference has already been made. It is reported that inclusion bodies, pointing to the action of a filter-passing virus, have been found in the epithelial cells of the renal tubules in many of the St. Louis cases, and this, if confirmed, may prove to be a point of great importance, but up to the present no detailed pathological studies have been published. There appears, however, to be evidence of a much more wide-spread infection throughout the body in these cases than in previous outbreaks of encephalitis.

The importance of keeping a keen watch for any similar outbreak in Canada is evident. Suspicious cases should be reported at once. Where facilities are available careful bacteriological investigation, including animal inoculation, should be carried out. And finally every effort should be made to obtain autopsies on fatal cases.

WILLIAM BOYD.

MEDICAL ECONOMICS

MEDICAL Economics considers the condition of the material prosperity of the medical profession. As this condition is closely related to, if not dependent upon, the ability of the public to pay for medical care, practically, medical economics is a consideration of how the medical profession may

secure a reasonable remuneration for their services to the public, and of the means whereby the public may make provision for payment for these services.

We presume that medical economics has always forced itself more or less upon the attention of a large percentage of the medical

profession, because it is relatively only a small number whose incomes have been such as to free them from the worries of providing for themselves and their families. To-day the problem has become urgent, and the medical profession are called upon to consider this acute condition growing out of the present economic situation, and the chronic condition which has been with us and will return after the acute stage is passed.

It is most desirable that these two phases of the problem be kept separate and distinct, because the treatment of the acute phase may have no relation to acceptable treatment of the future chronic condition.

First of all, with regard to the present position of things, there is no doubt that the profession of Western Canada are bearing the heaviest burden, and, in consequence, are most insistent upon the need for action. The Canadian Medical Association did, in the present year, urge upon the Dominion Government that provision for medical care should be included in unemployment relief. Early in October, representatives of the Canadian Medical Association waited upon the Prime Minister, and, armed with letters of approval from most of the Provincial Governments and the Provincial Medical Societies, placed before him the facts of the situation, and urged that favourable consideration be given to the payment of physicians for the medical care of the unemployed and their families.

The medical profession glory in certain traditions, one of which is that the members of the profession care for those who are in need. Traditions have their place, but, as times change, we must view tradition in the light of reality, or we shall become enslaved, just as medicine was bound for centuries to the traditions of Galen. There is no reason why the medical profession should, alone, attempt to shoulder an economic burden which will crush it. There will always be

opportunities for self-sacrifice on the part of the profession, but to call upon it to provide free medical service is neither logical nor desirable.

The chronic problem of medical economics is to make medical care available on a basis which will be satisfactory to the profession and to the public. The Committee on Economics of the Canadian Medical Association is at work preparing a plan or plans in order that the medical profession of Canada may be prepared to guide legislation, if and when such legislation comes to be considered. Obviously, the strength of the medical profession in dealing with governments is in proportion to the extent to which the profession are organized and capable of speaking as a united body through their own voluntary associations. The individualist who insists on independence to the point of refusing to become a member of his medical society is helpful neither to himself nor to anyone else.

The *Journal* desires to serve the profession, and, because of the importance of the subject of medical economics, has invited correspondents in all the provinces to furnish material covering their conditions, and this material will be published from month to month. Letters from individuals are welcomed by the *Journal*, and these will be published as space permits. It is suggested that, for the sake of clarity, correspondents on the subject accept the following definitions:—State Medicine—the provision of medical services by the state, through medical and auxiliary personnel employed by the state and paid for out of public taxes; Health Insurance—the provision of medical services through an insurance fund to which those eligible for service make a contribution. Health Insurance may be compulsory or voluntary, and the insurance fund may receive contributions from employers and the state as well as from the insured. G. F.

For centuries the Chinese have paid their doctors to keep them well rather than to cure them when they were sick. Many an effort has been made by inquisitive visitors to China to check up this well-known bit of scientific information. The results have been discouraging, however, showing that until recently

the Chinese have had no doctors worthy of the name to practise preventive medicine, or any other kind. Even though the Chinese doctor story is evidently a myth, it carries a valuable suggestion. Positive health, periodic medical examination, early diagnosis, prevention of disease, make up the message that is beginning to prevent much suffering and save many lives.

Editorial Comments

The Presidential Address at the 80th Annual Meeting of the Medical Society of Nova Scotia, 1933

Presidential addresses are, we fear, usually regarded by the rank and file of our profession as necessary evils. Too often they are banal and uninspiring; too often they lack originality; too often they are a "weariness of the flesh", not only to those who hear them but to those who have the difficult task of preparing them. No doubt almost any president would gladly evade the duty of preparing a formal presidential address. Dr. K. A. MacKenzie's address, however, delivered on the occasion of the Annual Meeting of the Medical Society of Nova Scotia, strikes us as "something different". He might have dipped into the past, proving, what everybody knows, that "there were giants in those days;" he might have waxed eloquent on the high destiny to be reached by medical endeavour in the future; he might have handed "bouquets" to all and sundry. He did none of these things. He chose a topic which is much in our thoughts at the present time, and about which there is much difference of opinion, a topic of national, indeed international, interest, involving a problem which demands enlightened consideration—in short, medical education. He has a message for his confrères; his points are well taken, and his conclusions seem to us sound. This address, which appeared in *The Nova Scotia Medical Bulletin* for September, 1933 (Vol. 12, No. 9, p. 469), should be read by every medical man who is interested in the advancement of his profession.

Doctor MacKenzie cites the fact that, despite efforts at improvement, criticism of existing systems of medical education is rife, which means, of course, that we are dissatisfied with things as they are, and he strikes at the root of the matter when he says—"Medicine is becoming more complicated and more fascinating each year. It has made marvellous strides in the last half century and is still undergoing change. Medical education must adapt itself to these changes, not only within the profession, but also to the changes and demands of society in general. It follows that systems of training are not fixed and must undergo frequent revision." He thinks, further, that the matter has been left too much to the universities and governing bodies, and that the profession generally has failed to lend a helping hand.

Doctor MacKenzie deals with medical education under three headings—pre-medical, undergraduate, and post-graduate training. "The pre-medical period begins with a wise selection of our ancestors. Few realize how much they owe to the hereditary characteristics transmitted

from their forbears. Honesty, integrity, love of service to fellow men, and capacity for work are inherited qualities, and, with early training, play an important part in the personal make-up of an individual, and so contribute to the making of a good physician. Arbitrary requirements for admission to medicine are necessary, and at the present time are controlled by governing bodies and universities. . . . Up till now a student's fitness for medicine has been estimated on purely academic qualifications, frequently by laymen. The time has come when other considerations must count, character, personality, ability, and resourcefulness. Dalhousie has just adopted a system by which all applicants are scrutinized by a committee of medical men who will judge of their fitness to enter medicine." No doubt, the idea underlying this is highly commendable, but one can hardly envy such a committee its task. The qualities specified as desirable in a medical student, while real enough, will, we fear, be hard to appraise in any given case. If appraisal is to be attempted, then, *fiat justitia, ruat coelum*. Undoubtedly, as Doctor MacKenzie suggests, background counts for much. One is tempted to think that the old Greek plan of a medical family, clan, or guild, had something to commend it. Such were the Asklepiadæ, of which guild Hippocrates himself and Aristotle were members. The idea might be acted upon nowadays, avoiding, of course, certain obvious defects in the system, but accepting its good points. One cannot help adding, however, that the qualities on which Doctor MacKenzie, properly, lays so much stress should be supplemented by two others—the power to observe and the power to reason. These, too, may be inherited, but can, also, be acquired and cultivated. But this would seem to be a task for the common schools. If the student has not acquired these powers by the time he reaches the university he is unlikely to acquire them later. A novel, a difficult, and an over-stuffed curriculum effectually prevents this.

In speaking of the teaching of the special branches in a medical course Doctor MacKenzie has this to say. "With the rapid accumulation of knowledge and the increase of specialists, who, as a rule, are only trained and interested in their own particular subject, there is a real danger of overstepping the mark, with disastrous results to the student. *Control and coordination are very important, and it cannot be too strongly emphasized that principles, not a vast array of confusing facts, should govern all teachers in an honest attempt made to teach what is most useful.* (The italics are ours. Ed.). Over-cramming with technical knowledge, especially at the expense of fundamentals, may defeat the main object of a good undergraduate course.

Advanced work, while stimulated in the undergraduate period, belongs to the post-graduate period." Doctor MacKenzie adds, with justice, that "what is true of the so-called scientific subjects is equally true of the clinical subjects." He speaks, too, with approval of the final "clinical year", as in operation at Halifax, Montreal, and Winnipeg. The student is relieved of all written examinations at the end of his fourth year and devotes the final year of twelve months, instead of nine as formerly, to clinical work.

In discussing post-graduate studies, Doctor MacKenzie mentions internships, post-graduate courses, medical associations, and the study of good literature, particularly the biographies of the great medical leaders. Internships are being gradually more appreciated; indeed, 90 per cent of medical graduates spend from one to three years in hospital work before taking up private practice. "The value of medical gatherings is impossible to measure." May we take this opening to urge all medical men to join their own local and provincial medical societies, and, with these the Canadian Medical Association. "We are fortunate in Canada in having one of the best national associations in the world, with a *Journal* which has no peers as an all-round publication." We thank Doctor MacKenzie, incidentally, for thus publicly expressing sentiments which are so gratifying to us, but we hope that his remarks may prove an incentive for all members of the profession, without exception, to join the national Association. At no time has the need been greater for all to band themselves together in a body able to take effective action and make itself articulate on the many problems, educational, social, and economic, which are confronting us to-day.

"I know of no greater stimulus or source of inspiration than a study of the lives of our great leaders. Who can read the biographies of Osler, Mackenzie, Pasteur, Lister, Laennec, Stokes, Sydenham, Hunter, Bright, Harvey, and scores of others, without a lesson, and without being a better physician for having read?" Who can read the story of Dr. McLure, and not realize that something has been added to his store of practical knowledge."

Doctor MacKenzie ends on this high note. "Whether you are a specialist or a general practitioner; whether you have attained a high place in your profession, or whether your lot is cast in humbler places, you will add glory to a noble profession every time that you earnestly, honestly, and faithfully PLAY THE GAME."

A.G.N.

The Jubilee of the Manitoba Medical College

On November 18, 1883, the opening lecture was delivered in a newly-born school of higher learning, to wit, the Manitoba Medical College.

Fifty years have passed since then, but the record of that institution has been one of steady progress and high achievement. Born in doubt and "cradled in adversity," the Manitoba Medical College has in that comparatively short space of time passed from feebleness to strength, and has taken a worthy place among the first-class medical schools of Canada. Those of us who as examiners for the Medical Council of Canada have come in close contact with medical graduates from all parts of Canada, and even from elsewhere, and thus have been able to appraise the comparative qualifications of the candidates presenting themselves, will bear willing testimony to the excellence of the product emanating from the school at Winnipeg. Fifty years are but a short time in the history of medical education and shorter still in the history of civilization, but bulk larger, it is clear, in the freer and more dynamic atmosphere of our Canadian West. The success that the Manitoba Medical College has attained in fifty short years can only be explained by "vision", determination, and industry on the part of those directing the fortunes of the institution. From the quality of the output one may, we think, rightly deduce the quality of the teachers. The simple, unvarnished account of the foundation and growth of this medical school, written by Dr. Ross Mitchell, of Winnipeg, to be found in this issue of the *Journal*, will be read with interest and pride by all those interested in medical education and the intellectual development of our country. We note that when authority was obtained to found a medical school in Winnipeg, those who promoted the idea hesitated to put it into effect at once; the determining "push" came from a keen band of students. So, a dream became a fact. In this instance, apparently, the juniors evinced more "vision" than did the seniors. But, the spirit of the West is the spirit of Youth! Even so, the venture could not have been a success had it not been for the outstanding character of the first Dean and the quality of the men whom he gathered about him. Much strength and dignity, too, were gained by the amalgamation of the Manitoba Medical College with the University of Manitoba, as its medical faculty, which event took place in 1919. Since that date the galaxy of able men that has directed the fortunes of the Faculty, and the high quality of the teaching and research that is now being done in its hospitals and laboratories make it certain that the Faculty of Medicine of the University of Manitoba will continue to maintain and even surpass the high achievement of the past. Although, strictly speaking, the jubilee of the College occurs this month, it has been decided for sufficient reasons to hold the formal recognition of the event next Spring.

A.G.N.

Retrospect

THE USE OF THE X-RAY IN OBSTETRICS*

By W. G. COSBIE,

Toronto

The x-ray has not come into popular use in obstetrical practice. This is the more remarkable because of the readiness with which many problems of surgical and medical practice are solved or the solution substantiated by this means; on the other hand, the obstetrician is content to rely entirely on his natural faculties to determine questions which just as materially affect the life, health and happiness of the patient who has placed herself in his hands. The failure to appreciate the value of roentgenography is due to the inconstancy of the results and a fear of injury to the fetus. The history of this work demonstrates, however, that a more perfect technique eliminates uncertainties and that the diagnostic exposure is not injurious. Beyond a doubt roentgenology provides a decided step forward in the development of obstetrics from an art to an exact science. Its more routine use is comparable to the positive laboratory control of pregnancy toxæmia, and will result in a definite lowering of maternal morbidity and mortality.

The use of the x-ray to diagnose early pregnancy is superlative. The Ascheim-Zondek test has proved so satisfactory that many are prone to depend on it to the exclusion of a careful bimanual examination. To show what has been done, however, Heuser has been able to diagnose pregnancy at two weeks, using intrauterine lipiodol, and Peterson, at six weeks, by means of pneumoperitoneum. Apart from these radical measures the diagnosis of pregnancy, based on the recognition of the fetal skeletal parts, is only possible by the fourth month. Bartholomew, Sale and Calloway say that diagnosis is positive in about one-third of the cases at five months, one-half at six months, and almost constantly after that period. The greatest use of the x-ray in the diagnosis of pregnancy is when there is an associated condition such as a fibroid or an ovarian cyst.

One of the earliest x-ray investigations was the intrauterine study of the centres of ossification. This provides a means of determining the age of the fetus. Physical obstacles such as the

thickness of the abdominal wall and the slight density of the fetal bones, and the fact that so often the fetus is a moving target, have tended to lessen the practical use of this procedure.

From the thirty-sixth week on, the age and development of the fetus are of real interest. Thoms, who, so far as this continent is concerned, is the pioneer in roentgenographic mensuration, has devised a method of fetal cephalometry by means of which the size and weight of the child may be deduced. Reference will be made to this later.

When the increasing development of the child threatens a difficult labour a lateral plate is very valuable. It shows the relationship of the head to the antero-posterior diameter of the pelvis. Whether or not there is any particular value in seeing and estimating the angle of pelvic inclination, that is, the angle which the brim of the pelvis makes with the horizontal, is a controversial point. Williams in the last edition of his book stated that "except when markedly abnormal, the pelvic inclination possesses no practical obstetrical significance and is of value only in the study of atypical pelvis and in anthropology." This opinion is also held by Thoms, who at the same time points out that in a lateral plate we see the relationship of the sacrum throughout its length to the back of the pubes. This is the only point of any importance, providing the normal mobility of the sacro-iliac joints is not impaired. F. W. Lynch made an interesting x-ray study of changes in the pelvic joints. His observations showed a separation in the sacro-iliac and pubic joints which is permitted by the increasing joint mobility. It has long been known that in animals not only does the pelvis enlarge very markedly but the pelvic inclination changes. The fact that the cow's rump changes its plane a few days before the onset of labour has long been known to cattle raisers. The change produced in the angle of pelvic inclination depends entirely on posture and does not affect the dimensions of the pelvic inlet. The action of the Walcher position as a means of increasing the antero-posterior diameter of the pelvic inlet depends on the levering of the sacro-iliac joints apart in an antero-posterior direction, and, obviously, must be accompanied by a change in the angle of pelvic inclination.

It has often been said that the fetal head is the best pelvimeter, but during the test of labour when the head is slow to engage and the cervix to dilate most of us have spent many anxious hours of expectancy trying to decide whether disproportion or lack of flexion is causing the delay. Stereoscopic plates are then especially valuable.

The x-ray provides a means of diagnosing

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Read before the Section of Obstetrics and Gynecology at the meeting of the Canadian and Ontario Medical Associations, June 23, 1932.

fetal malformations. As far back as 1917 Case reported the diagnosis of anencephaly on the absence of the cranial vault, small orbits, absence of the sella turcica and a tendency to cervical spina bifida. Greenhill has advised that an x-ray should be taken before Cæsarean section, especially in cases of placenta prævia, when, he claims, anencephaly is more frequent. Hydrocephalus has also been diagnosed successfully. Very careful technique, and possibly repeated films, may be necessary because the associated hydramnios obscures the outline.

H. B. Mathews, in an excellent article in the *American Journal of Obstetrics and Gynecology*, November, 1930, demonstrates what many others have claimed, that the x-ray provides a means of diagnosing intrauterine death within three or four days of its occurrence, any time after the fourth month of gestation. There are four signs, namely, overlapping of the cranial bones, asymmetry of the head with wrinkling of the scalp, collapse of the thoracic cage, and bowing of the vertebral column. There are many who hold that these signs are difficult to determine and often late in appearance.

The x-ray is of great assistance in diagnosing the position and presentation of the child when a heavy abdominal wall prevents ready palpation. It is helpful also, in the diagnosis of multiple pregnancy. In this case a positive x-ray plate is confirmative but, unfortunately, this is not always obtained because of movement or the position of one of the children.

In 1930 an interesting paper was published by Menees, Miller and Holly reporting a series of cases in which they had injected a solution of strontium iodide into the amniotic sac in order to outline its contents. They claimed this to be a harmless method by which the placenta could be located. They were also able to determine the sex of the child. It is an established fact that the morbidity and mortality associated with placenta prævia is profoundly affected by injudicious manipulation. Therefore it is not unnatural that attempts have been made to verify the abnormal situation of the placenta by x-ray. One does not feel that unaided the x-ray has been of much value. With the advent of colloidal thorium (thorotrast) a new adjunct has come to the hand of the roentgenologist. European investigators have reported the successful localization of the placenta by this means in experimental animals. Now the original observations of Dr. W. H. Dickson, of the Toronto General Hospital, with the collaboration of Dr. Dudley Irwin, appear to have established that thorotrast may be used to locate the placenta without untoward effect on either the mother or child.

In 1897 Budin, of the Paris Maternity, described a Naegele pelvis, and for three decades the chief use of the x-ray was to study abnormal pelves. It was obvious from the first that dis-

tortion obviated any attempt at mensuration. It is over two hundred years since William Smellie described the diagonal conjugate diameter of the pelvis and laid the foundation of pelvimetry. Ever since then men have striven to obtain an accurate means of measuring pelves. The number of pelvimeters has been rivalled only by the number of obstetrical forceps. It remained for Thoms in 1925, using an adaptation of an earlier system of Bouchacourt, to develop an x-ray technique which accurately measures all the diameters of the pelvic inlet and traces its outline. The principle of Thoms's system is to place the patient in an attitude so that the pelvic brim is as near as possible to the horizontal. The x-ray tube is centred on the mid-point of the pelvic brim and the distance of the plane of the pelvic brim above the film is measured. The exposure is made and the patient removed. A lead screen squared with perforations at one centimetre distance is then placed in the same plane as the brim of the pelvis was reckoned to be and at the same distance from the film. A flash exposure is made on the previously exposed film. This superimposes a squared centimetre measure on the outline of the pelvic brim. In cases of contracted pelvis, especially of the rachitic type, Thoms recommends the taking of an additional lateral plate to observe the relationship of the sacrum to the back of the pubes. As a rule he does not use the perforated screen.

Thoms's method of determining fetal maturity is simply a further application of the perforated screen. In a large series of cases he has observed that the occipito-frontal diameter of the unengaged head tends to lie transversely. The plane in which this diameter is lying is determined, and by use of the screen the length of the diameter is measured. An error in estimation through deviation from a true transverse lie affects the final reading less than three millimetres. From the occipito-frontal diameter he deduces the bi-parietal diameter, the heel to crown measurement, and a near estimate of the weight of the child.

Although Thoms's method remains the most generally recognized practice, several simpler procedures have been suggested. Last year a publication by Rowden in the *British Journal of Radiology* described a method of measurement, using a prepared scale according to the distance which the brim of the pelvis is found to lie above the sensitive film. Roberts's method is even simpler than this. He uses the following formula:—

$$\frac{\text{Measured diameter} \times \text{distance of tube from film—}}{\text{distance of 5th lumbar spine from film}}$$

Distance of tube from film

This reckoning is surprisingly accurate, the error being only about three millimetres.

In 1898 Sir James MacKenzie Davidson described a "cross thread method" for localization

of foreign bodies. He later suggested the application of this principle to roentgenography as a means of measuring the pelvis and visualizing its shape in space. Amongst others, C. R. Johnson, of Los Angeles, has perfected this technique. In the hands of experienced technicians this is undoubtedly a reliable method of pelvimetry. It is, however, too complicated to be generally advised as a routine measure.

During the last two years we have attempted to use Thoms's method of pelvic mensuration. Study of these films emphasizes the extreme variability of the shape of the pelvic inlet—a variation as extreme as that of any other human conformation. Two observations along this line are worthy of note. Recently Thoms has shown that pelves relatively longer in the antero-posterior than in the transverse diameter tend to prompt occipito-posterior presentations. Our own limited observations agree with this. Now, in all mammals except man the transverse diameter of the pelvis is shorter than the antero-posterior, *e.g.*, the dolicho-pellic pelvis. The opposite, the platy-pellic pelvis, is typical of the human female. The male type of pelvis gives evidence of reversion to the animal form. It has long been recognized that difficult labour and a high incidence of occipito-posterior presentations is to be expected with this conformation. Thoms carries this principle further and applies it to all pelves showing this tendency, that is, even

those recognized only by x-ray mensuration. May we emphasize at this point that the x-ray presents the only available method of determining the transverse diameter of the pelvic brim.

The second observation is to draw attention to the fact that in pelves departing from the normal shape the maximum transverse diameter may not be the available diameter. This is particularly applicable in cases of flat pelvis where we have been taught to believe that nature takes advantage of the transverse when the conjugate diameter is unduly shortened. Let us reflect on the effect of an exaggerated promontory in carrying the fetal head too far forward and apply this truism of major deformity to those cases where our old methods of pelvic mensuration would not prove warning of its existence.

From the standpoint of the teaching of obstetrics the x-ray opens a new field of direct observation which may revolutionize many preconceived ideas. Publications of German observers, particularly Warnekros and Sellheim, if confirmed, will put an end to mere theorizing with regard to the manner by which the child progresses through the pelvis and the placenta separates from the uterus. There is no doubt that in the next few years the proper application of the x-rays to many problems of obstetrics will bring many of those things which we now see "through a glass darkly" out into the light of day.

Special Articles

THE MANITOBA MEDICAL COLLEGE

1883 - 1933

By ROSS MITCHELL

Winnipeg

Winnipeg in 1883! A frontier settlement of perhaps 20,000 souls, stretched along the banks of two rivers, not yet recovered from the collapse of a real estate boom which at its height had made many millionaires on paper but left behind it ruin and disaster. Yet, when in 1873 the little community of 215 people had sought incorporation it was not as a village, or even a town, but as a city! Five years later it was linked to the outside world by railway, and with the rush to the plains of the last great west its growth was phenomenal. So rapid was the development of the country that the imagination of even the most conservative and sober-minded could not fail to be quickened. What in older countries would have been premature or perhaps impossible, here became justifiable and even necessary. An instance of this was the institution in 1877 of the University of Manitoba, formed by the union of Roman Catholic, Anglican and Presbyterian colleges. Despite the collapse of the boom,

despite the mud in summer and the cold in winter, the faith of the pioneers of the Canadian North West in its possibilities never wavered. It was the faith that can move mountains and, as one of the things hoped for, the Manitoba Medical College was begotten of that faith.

Notwithstanding its newness and comparative smallness, Winnipeg in 1883 could boast of a remarkable group of medical men—Lynch, Kerr, Jones, Good, Brett, A. H. Ferguson, Blanchard, Chown and Higginson. To this group there came in July, 1883, a young man, scion of a distinguished family, a graduate from Toronto university and with post-graduate education in London, who announced his intention of starting a proprietary medical school. Two or three of the Winnipeg doctors gave him a measure of support, but the majority would have none of him. Dr. Kerr, the leader of this group, upheld two principles; first, that the granting of degrees should rest solely with the University of Manitoba and not with the Medical School, and, secondly, that the established practitioners should be the founders. To prevent the organization of a proprietary medical school the legislature of Manitoba was requested to grant a charter incorporating the Manitoba Medical College. Thirteen physicians headed by Dr.

Kerr and including Dr. D. H. Wilson, Provincial Secretary in the Norquay Government, were named as incorporators. Yet even the incorporators were not fully convinced of the necessity for a new medical school. They had a jealous regard for the interests of the profession, and a hesitation born of the apprehension that a too early formation of a medical school would lead to all those evils which inefficient medical instruction produces led them to look with considerable disfavour on the proposition as it first presented itself to them. But they had not reckoned with the medical students of Manitoba who, at a meeting in September, pointed out the hardships and expense incident upon attendance at eastern universities and requested that the charter be implemented and a school opened that autumn. The importunity of the students prevailed, the Winnipeg School Board granted a request to allow lectures to be given in the Central School, and Dr. Kerr, who had been chosen Dean, delivered the inaugural lecture in the Educational Offices on the evening of November 15th. An advertisement in the *Manitoba Free Press* of that date, announcing this lecture, stated that classes would begin at 8 o'clock the following morning. In this connection it must be remembered that fifty years ago more than half the medical schools on this continent did not open till after four o'clock in the afternoon.

In that introductory lecture Dr. Kerr struck a curiously modern note. "It has become of late years," he said, "very much the fashion for the practice of medicine to run toward specialties, and it is my duty to warn you against taking up this study too early in your career. The more general your knowledge of disease and the more

thoroughly you have become acquainted with the principles of every means of physical diagnosis, the better qualified you will be to undertake any special department of practice. You must first become general practitioners before you can become successful specialists."

The new school was fortunate in its Dean. James Kerr was born in 1848 at Port Stewart, County Antrim, Ireland, graduated M.D., M. Ch. from Queen's University, Belfast, in 1870, and served for a year as an intern under Sir William MacCormac. In

1873 he went as transport surgeon on S.S. "Sarmatian", carrying the 42nd Highlanders to the Ashanti war, and on the conclusion of this campaign he made several trips to Canada as ship's surgeon. In 1875 he settled down as surgeon to the Londonderry Iron Mines at Londonderry in Nova Scotia. About this time he made the acquaintance of William Osler and Francis Shepherd. When, in 1876, he married, Osler was his best man. On his honeymoon the young doctor heard Joseph Lister address the International Medical Congress on "Antiseptic Surgery". Though Lister's reception was "not marked by enthusiasm", Kerr became an



Dr. Kerr

enthusiastic disciple and determined to go in company with Shepherd to Germany where Lister's methods were being applied to surgery. After their sojourn on the continent the two friends parted, each to become a Dean of Medicine. In 1880 Dr. Kerr came to Winnipeg and soon became the leading surgeon of the Canadian North-West. In 1885, during the Riel rebellion on the Saskatchewan, he was Surgeon-Major of the base hospital at Winnipeg. A trip to the front for two weeks with Drs. T. G. Roddick and James Bell, of Montreal, brought on an attack of acute rheumatism and nephritis which caused

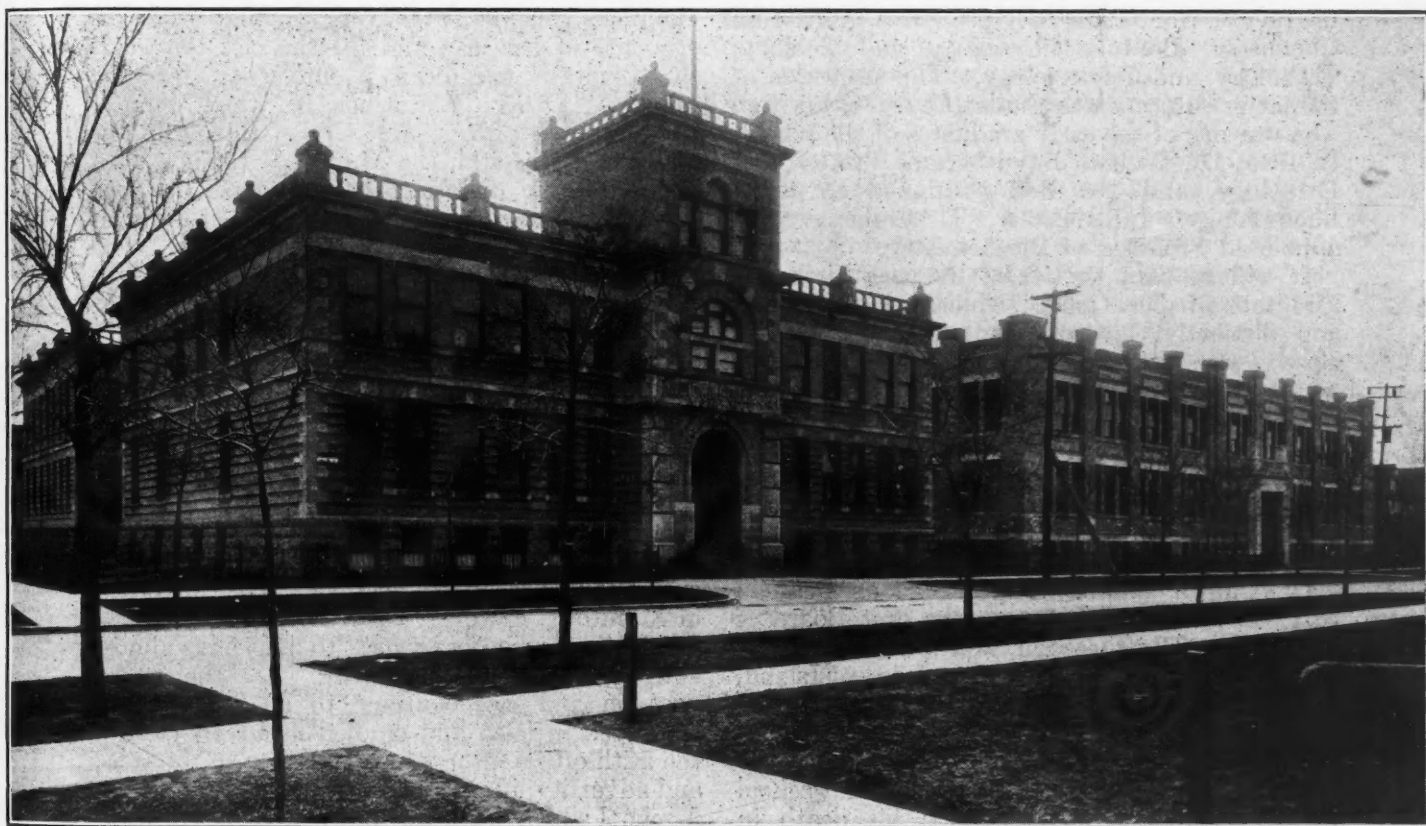
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him in 1887 to seek the milder climate of Washington, D.C. There four years later he became Professor of Surgery in Georgetown University School of Medicine. His health proving unequal to the task he resigned in 1894, but continued in private practice, an honoured and esteemed practitioner, until his death in 1911.

Other members of the first Faculty of the College were likewise able teachers. J. R. Jones, a Toronto graduate who had studied at the London Hospital under Sir Andrew Clark and Hughlings Jackson, was the first Professor of Medicine, and lectured in the "grand manner" with a mastery of incisive phrase; J. Wilford Good, Professor of Clinical Surgery and Lecturer

J. W. Whiteford, the first Registrar of the College, graduated from McGill, served as Medical Officer with the 90th Winnipeg Rifles in the 1885 campaign and died at an early age. W. R. D. Sutherland, who lectured on Medical Jurisprudence, was a native of Manitoba, son of Senator Sutherland.

A spirit of tolerance was evident in the school from the beginning. The Charter provided that no religious test was to be exacted from professors, lecturers, students or servants. One of the incorporators, Dr. Théogène Fafard, who taught Botany for several years, represented the French-Canadian element in the province. The standard of entrance was to be the equivalent of one year



Buildings of the Faculty of Medicine, University of Manitoba

in Ophthalmology and Otolaryngology, and one of the first to specialize in these latter subjects, delivered lectures that were enlivened with racy wit. R. G. Brett, the first lecturer in Therapeutics, later moved to Banff, established a sanitarium there and became Lieutenant-Governor of Alberta. Alexander Hugh Ferguson, first Professor of Physiology, after a notable career as a surgeon in Winnipeg moved to Chicago and there made considerable contributions to surgery, particularly in the field of hernia. Robert Johnstone Blanchard, Professor of Anatomy, a native of Pictou, graduated in medicine from Edinburgh, where he was Lister's dresser, came to Winnipeg in 1881, became a leading surgeon, and in 1909 was President of the Canadian Medical Association. In 1915 he went overseas in command of No. 3 Casualty Clearing Station.

in the University. Fifteen students attended the first session. In 1884 a building was erected at the corner of Kate Street and McDermot Avenue, close to the Winnipeg General Hospital. Here work was carried on until 1906, when the first building was erected on the present site, Emily Street and Bannatyne Avenue, immediately west of the General Hospital. Five years later the building was doubled in size. In 1913 the animal building was erected, in 1921 the Physiology and Bio-chemistry building and in 1922 the Pathology and Bacteriology building, the latter with the aid of a grant from the Rockefeller Foundation.

In May, 1886, the first graduates, six in number, received their degrees from Manitoba University. In 1887 Dr. Good became Dean on Dr. Kerr's removal to Washington and held office until in 1898 he left to practise for a time at Dawson,

Yukon Territory. Dr. J. R. Jones acted as Dean until 1900, when Dr. H. H. Chown, a distinguished graduate of Queen's University, Kingston, was appointed head of the faculty. On his recommendation, in 1905 the course was extended to five years. Up to 1910 the members of the faculty had given their services without remuneration, but in that year the first full-time appointment was made. This was to the Chair of Anatomy and the post was filled by Prof. E. J. Evatt, who held it until 1914, when he left to serve with the Royal Army Medical Corps. His successors in the chair have been Alexander Gibson, J. C. B. Grant and R. G. Inkster. In 1905, when the University of Manitoba became a teaching university, medical students received instruction from University professors in Physics, Chemistry, Botany, Physiology and Zoology, Pathology and Bacteriology. The professor of the latter subjects was the late Dr. Gordon Bell who was one of the early graduates of the school. In 1915, Dr. William Boyd became Professor of Pathology, and Dr. Bell continued to teach Bacteriology. In 1920 A. T. Cameron was appointed Professor of Biochemistry.

It will be seen that from its very birth the Manitoba Medical College, while a self-supporting and distinctly separate institution, was linked closely with the University of Manitoba. The wise and statesmanlike policy of Dr. Chown was to merge the College with the University, and in 1918 the property and equipment of the College, valued at \$250,000, was deeded to the University "on condition that the University establish a Faculty of Medicine and carry on the work of medical education in an efficient manner."

Dr. Chown automatically retired as Dean in 1917, on accepting a seat on the first Board of Governors. His successor was found in Dr. S. Willis Prowse, a native of Prince Edward Island, and a graduate in medicine from Edinburgh, who at the time of his appointment was in command of a Casualty Clearing Station raised by the College. Under his direction the school made considerable advance. On his death in 1931 Dr. A. T. Mathers, a graduate of the College, and Director of Mental Hygiene for Manitoba since 1918, was appointed Dean and still holds office.

The school from its inception has been modelled on the lines of British schools, particularly Edinburgh. In his inaugural lecture Dr. Kerr gave this advice to the students. "Beyond all things, as you hope to master scientific medicine and practise it successfully afterwards, do not make short work of your anatomy and physiology." That admonition has never been forgotten. In its clinical facilities the school has been particularly fortunate. St. Boniface Hospital was organized in 1871, and the Winnipeg

General Hospital in 1872. By 1884 the latter hospital was operating on its present site, and its wards were the equal of any on the continent at that time. Members of the faculty were also on the honorary attending staff of the hospital, which is in effect a university hospital. The opening of the Winnipeg Maternity Hospital in 1883 allowed clinical instruction in Obstetrics to be given there. This hospital later became part of the Winnipeg General Hospital. The first site of the school was only three blocks east of the General Hospital, but the present site lies immediately west of it and is connected with it by an underground corridor which allows easy access even in the most inclement weather. The clinical surgical lectures of Dr. A. H. Ferguson at St. Boniface Hospital were very popular with the students of the 90's and for the last ten years St. Boniface has been a university teaching hospital. Other institutions in which clinical instruction is given are Grace Hospital, the Children's Hospital, the Municipal Hospitals for communicable diseases, the Psychopathic Hospital, the Manitoba Tuberculosis Sanatorium at Ninette, the St. Boniface Sanatorium in St. Vital and the Central Tuberculosis Clinic. The fifth year of the course is an interne year and students are admitted to the city hospitals as well as to hospitals in Vancouver, Regina, Moose Jaw, Saskatoon and Fort William.

Manitoba Medical College has never had a fairy godmother. Until 1918 it existed on fees paid by students, a method of financing made possible only by the faculty giving their services gratuitously. With increasing demands for equipment necessary to meet present day requirements such a course became impossible. The University of Manitoba, however, has little endowment and defalcations recently brought to light have almost entirely wiped out that little. Yet the school goes on and will continue to go on. It was conceived in faith and cradled in adversity, but the faith of the fathers has passed on to the sons, and adversity, if not too great, creates endurance. A school which has trained men and women to go out to minister to the medical needs of the people of the Canadian West and elsewhere, which has a rating equal to that of the best of other medical schools on this continent, which has produced such graduates as Frank Calder, who, as a surgeon at Lethbridge in the early 90's, won enthusiastic praise from Sir Frederick Treves, Prof. Gordon Bell, a pioneer in public health and a rare spirit, and Frank Westbrook, pathologist, Dean of Medicine in Minnesota University, and first President of the University of British Columbia, can look the whole world in the face. Its record is one of honest achievement inspired by self-sacrifice and a desire to contribute to the happiness of mankind.

Medical Economics

MEDICAL SERVICE TO INDIGENTS IN WINNIPEG

By E. S. MOORHEAD

Winnipeg

A survey carried out by a representative committee in 1930 estimated that the medical profession of Manitoba contributed in 1929 voluntary service to the value of \$1,300,000 to those claiming to be unable to pay for medical attention.

At a mass meeting of the profession of Greater Winnipeg, held December 21, 1931, it was moved that representations be made to the Winnipeg City Council, with the object of having payment on some reduced but unspecified scale for service to indigents, whose numbers were increasing rapidly. Appeal was made from the floor of the house not to discard the traditions of the profession; doctors had never refused their services to those asking for them, and this was no time to begin. The motion was lost. At this time, the City Relief Commission was providing clothing, fuel, money for food, electric light, water and rent.

A year later, the question again became acute in medical circles, and a committee representing the membership of the Manitoba Medical Association and the Winnipeg Medical Society was appointed. It began to function at once. As a solid organization was necessary, the committee restricted its efforts to the affairs of the medical profession in Greater Winnipeg. Certain principles were laid down. (1) There should be free choice of doctor. All European national health schemes, with the exception of that in Russia, permitted free choice. Persons on relief were at liberty to buy their provisions and live where they liked, within the restriction of their income. (2) There should be payment on some reduced scale for doctors' services. (3) These conditions should only apply for the present to those officially in receipt of unemployment relief, of whom there were at that time in Manitoba something like 50,000 to 60,000.

There were several reasons for this decision, the principal being that those on relief were for the time being wards of the state. Other wards of the state, such as soldiers, sailors, Indians, inmates of gaols, penitentiaries, mental asylums, etc., were provided with all necessities, including medical services. The doctors were still prepared to take care of those who, while barely able to provide necessities, were not as yet on relief. Many of these were getting along with assistance from friends or relatives or by extension of credit from the grocer and coal-dealer, etc.

Interviews were held with the Premier of Manitoba, the Mayor and Aldermen of Winnipeg, and various relief commissions. Sympathetic

hearings were given. It was acknowledged that the doctors had made an excellent presentation of their case. Plans asked for by province and city were forwarded, and for all the committee knows were pigeon-holed. On every occasion the doctors were advised to send a deputation to Ottawa to present their case to the Prime Minister. Since all relief is, under the British North America Act, a municipal responsibility, it was recognized that such action would be futile.

During all this time, an educational campaign was carried out in the press for the instruction of the doctors as well as the public. Not enough can be said in appreciation of the press, which published everything submitted, and also printed many editorials and articles favouring the doctors' case.

It became apparent in March that the profession would be compelled to take further steps. All medical services were still being supplied, and therefore the authorities did not see fit to act. The chairman of the Relief Commission announced frequently over the radio that a full medical service was being provided. It was not stated that this service was being provided by one doctor.

It was necessary to find out to what extent the doctors were behind the movement, and how much real authority they were prepared to give to their committee. A meeting of the honorary staffs of all the hospitals in Greater Winnipeg was called. After a full discussion, the following document (A) was presented. Within two or three days, 129 out of a possible 132 had signed it.

"A"

I hereby authorize Dr. E. S. Moorhead, Dr. A. J. Swan, or to notify the Board of Directors of Hospital that, on and after a date to be decided by the above, I shall no longer attend any patients in the Out-Door Department or Wards of the above Hospital who are officially in receipt of unemployment relief from City, Province or Dominion. I reserve to myself the right to attend all indigent patients other than those on relief, and cases referred to me by another doctor, and all emergency cases.

(Signed).....

A few weeks later, a mass meeting of practitioners endorsed the actions of the committee and authorized further action in the following resolution:—

"That your committee be empowered to carry on such negotiations as they may deem expedient for the furtherance of its objects."

This was signed by about ninety per cent (90%) of the 320 doctors.

A motion was also passed, as follows:—

"That your committee are of the opinion that any proffer of a salaried appointment or other suggestion which touches the economics of the whole profession, coming from the authorities to members of the profession, should be referred to the Executive Committee before acceptance."

On April 15th, the Winnipeg General Hospital closed its out-door clinic for financial reasons, and not from any action of the profession, which was by this time fully organized. The number of patients attending the clinic had risen from 6,485 in 1927 to 24,582 in 1932. In the latter year, there were about 85,000 consultations. The bed patients in 1927 numbered 13,467 and 14,814 in 1932. Several other hospitals also operated free clinics.

Early in June, the attached notices (B and C), which are self-explanatory, were sent to all hospitals, doctors, and to the press.

"B"

June 12th, 1933.

The Chairman,
Board of Trustees,
. Hospital,
Winnipeg, Manitoba.

Dear Sir:

I beg to notify you that on and after the first day of July, 1933, the members of the Honorary Attending Staff of the Hospital, whose names appear on the list attached, will decline to attend patients in the Out-patient Departments or Wards of the Hospital, who are officially in receipt of unemployment relief from Municipality, Province or Dominion.

Authority has been given to me for this action over the signatures of each of these doctors.

Your Honorary Staff will be quite willing to attend indigent patients other than those on relief, indigent or relief patients when referred by a private practitioner for consultation, and emergency cases.

Yours truly,

(Signed) E. S. MOORHEAD,
Chairman, Special Relief Committee.

"C"

SPECIAL RELIEF COMMITTEE
OF THE
WINNIPEG MEDICAL SOCIETY AND THE MANITOBA
MEDICAL ASSOCIATION
102 Medical Arts Bldg.
Winnipeg

June 1st, 1933.

Dear Doctor:

The general committee appointed by you has been working since last October on the problem of medical services to citizens of this province who are on relief. The B.N.A. Act definitely states that all forms of relief are a municipal responsibility. We have approached the representatives of the city and also of the province. We received a sympathetic hearing to the extent that we were told that, as a profession, we were carrying an unreasonable load. We were asked to submit plans, and, having submitted them, we heard nothing more about them. The general impression left with us is that each governing body wishes to pass the responsibility on to another governing body. The net result is that, at the end of several months, we are no nearer to a free discussion of the problems, let alone a settlement of them, than we were at the beginning.

The Province of Ontario has in operation a plan which, while requiring a good deal of sacrifice on the part of the medical profession, is, according to official reports, working satisfactorily. Saskatchewan has passed legislation along similar lines, accepting responsibility for medical service to all indigents. Neither the city of Winnipeg nor the Province of Manitoba has acknowledged any responsibility, and

apparently will not do so as long as the medical profession carries the load.

At a mass meeting recently, you authorized your committee to take whatever steps were considered necessary. You are therefore requested to refuse to supply medical service, in the home or office, to cases on relief who ask that your services should be given for nothing. Seeing that there is little epidemic sickness, and that the health of the community is good, it is not anticipated that this will at the present time result in any hardship for the general public. This step is being taken now so that, when the usual increased illness and consequent demand for medical attention develop in the fall and next winter, those in authority will not be able to state that the medical profession embarrassed them and created a dangerous situation by suddenly refusing their services.

There are two exceptions to the general refusal to provide free service for cases on relief. (1) You should never refuse to attend a case which you believe to be an emergency, or where there is any immediate risk of life. Having made your visit and dealt with the emergency, your responsibility will cease when you have notified the city or municipal relief officer by letter or telephone. (2) Many doctors have patients now on relief, whom they have attended for several years. These patients have employed and paid the doctor, whom they look on as their friend and family adviser, as well as their physician. This refusal of services is not intended to apply to such people. If you feel that you have a moral or personal obligation to attend to any of your former patients, this action of the medical profession does not interfere with your liberty to continue to do so.

There are large numbers who have attended out-patient departments for years, and have therefore no family physician. Many people express dissatisfaction with the medical service supplied by the city relief commission, and prefer to obtain treatment from a private practitioner as long as no fee is charged. There are others who consult doctors, concealing the fact that they are on relief, and endeavour to change to another as soon as this fact becomes evident. It is to all these that the restrictions as regards free service are intended to apply.

THE PLAN OUTLINED ABOVE WILL COME INTO EFFECT
ON JULY 1ST, 1933.

It is recognized that full authority has been given in writing by ninety per cent (90%) of the doctors of Greater Winnipeg to carry out this or other measures for the furtherance of the consideration of our problems. As there does not appear to be any good reason for calling another general meeting, the committee felt that the action and the reasons for it should be fully explained to you.

Yours truly,

(Signed) E. S. MOORHEAD,
Chairman, Special Relief Committee.

THE DELEGATION TO OTTAWA RE MEDICAL CARE OF THE UNEMPLOYED

On October 6th a delegation from the Canadian Medical Association was received by the Right Honourable, the Prime Minister, at Ottawa, the purpose being to discuss the question of the medical care of unemployed persons and their dependents throughout Canada. The following gentlemen constituted the delegation:—
Drs. G. A. B. Addy, Saint John, President of the Canadian Medical Association; T. C. Routley, Toronto, General Secretary, Canadian Medical Association; L. Gérin-Lajoie, Secretary, Medical Association of the Province of Quebec;

F. C. Neal, Peterborough, President, Ontario Medical Association; E. S. Moorhead, Winnipeg, representing the Manitoba Medical Association; and D. S. Johnstone, Regina, representing the Saskatchewan Medical Association. The representations of the delegation were made in the form of a document, which is reproduced below, and was spoken to by each member.

184 College Street,
Toronto 2, October 5, 1933.

The Right Honourable R. B. Bennett, K.C.,
Prime Minister of Canada,
Ottawa.

Dear Sir,

Acting upon instructions of the Canadian Medical Association, which body represents the organized medical profession of Canada, we appear before you to-day. Most respectfully, Sir, do we desire to direct your attention to the following:—

(1) The Government of Canada is recognizing and discharging an honourable and humane obligation in providing funds out of the national treasury to the Provincial Governments of Canada, to extend relief to unemployed citizens and their dependents who are in need.

(2) If we are properly informed, relief expenditures have been set out by your Government to include food, fuel, shelter and clothing, but do not include medical care.

(3) On March 21st we wrote you, urging that medical care be included in unemployment relief. (A copy of the letter is attached to this memorandum.)

(4) On March 24th you replied, stating in part that "the Federal Government makes contributions to enable the Provinces to fittingly discharge their obligations." (A copy of the letter is attached to this memorandum.)

(5) The Provincial Governments of British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, and Prince Edward Island have advised the Canadian Medical Association that, in their opinion, medical care is an obligation which should be included in unemployment relief.

(6) The above mentioned Provincial Governments have further advised the Canadian Medical Association that, if permission were granted them by the Federal Government to include medical care in the list of relief provisions to which the Federal Government is contributing a portion of the cost, such care would be provided.

(7) The medical profession always has given freely of its services to those unable to pay for such services. But there comes a limit, beyond which any citizen, doctor or layman, finds himself powerless to proceed in giving of his time or money.

(8) At the present time, the medical profession, in some parts of Canada, have reached the point where they cannot further supply medical care gratuitously to persons on relief. The profession, however, adhering to its ideals and traditions, and having in mind that its first duty is the protection of the public health, will gladly undertake to contribute, by way of service, one-half of the cost of such care during the present emergency, and would respectfully suggest that the other half of the cost of their professional services be assumed by the State.

May we summarize.—

(1) The Federal Government is providing relief funds to the provinces.

(2) Such relief funds are intended to assist each province to fittingly discharge its obligations.

(3) The provinces have stated that medical care is an obligation and that the doctors should not be asked to contribute their services gratuitously, thus carrying the entire cost.

(4) The doctors are willing to contribute one-half

the cost during the present emergency, by accepting as their fees half the established tariff rate for their province.

(5) The provinces are willing to pay one-half the cost of medical care if the Federal Government will permit national funds to be used for the purpose on the same basis as such national funds are being used to pay for food, fuel, shelter, and clothing.

(6) Most respectfully, Sir, do we ask that your Government approve the addition of medical care to relief provisions, and that the provinces be so advised at the earliest possible date.

All of which is most respectfully submitted on behalf of the Association by

G. A. B. ADDY
E. S. MOORHEAD
D. S. JOHNSTONE
F. C. NEAL
L. GÉRIN-LAJOIE
T. C. ROUTLEY.

The Prime Minister, replying, made the following observations and statements.

(1) While I have every sympathy with the point of view you have expressed, you really have no contact with me; the matters you have presented are strictly the business of the provinces.

(2) I am fully aware of the necessity of proper medical care being provided all people on relief, but must insist that this is an obligation resting upon each Provincial Government.

(3) I am in entire accord with the argument that the medical profession should not be asked to carry the load of providing the necessary medical relief.

(4) I shall advise each province that it should undertake to provide medical care, to pay the cost of same, and in the event of the province doing this and submitting its cost figures to the Federal Government, sympathetic consideration will be given by the Federal Government to sharing the cost of such medical care according to the merits of the case presented by the province.

In the opinion of some members of the delegation, Mr. Bennett implied that the Federal Government would pay part of the cost of medical care where it was shown by a province that it could not afford to pay the cost. Seeing that various provinces have different needs, he would not tie himself to assist by any percentage or proportion of the funds expended.

The Prime Minister advised the Committee that the position of the Federal Government in the matter would be made very clear to each Provincial Government, and, further, that the Canadian Medical Association would be advised as to what was being said to the provinces.

It was pointed out to the Prime Minister that the delegation was under the impression, after conversations with some of the Provincial Governments, that the Federal Government had prohibited the utilization of Federal funds for medical care. The Prime Minister stated that the Federal Government had at no time forbidden the provinces to expend money for medical care, but that the Federal Government had set out specifically that they were supplying funds and had stated that these funds could be utilized in providing food, fuel, shelter and clothing. On the foregoing items the Federal Government has committed itself to a definite

proportion of the total cost, but the Federal Government is not prepared to commit itself to any proportion of the cost of medical care as a blanket policy covering the provinces as a whole. It should be repeated, however, that the Federal Government has no desire to see any province disregard its responsibility in respect to medical care, but, on the contrary, looks to each province to provide such care, and if the province needs financial aid in respect to medical care the Federal Government will not expect any province to carry the burden in this respect beyond reasonable limitations.

The interview lasted one hour. It was the opinion of the delegation that the Prime Minister of Canada shared completely our point of view with respect to the care of the people and the necessity of the doctor being paid, at least in part, for the services which he must render, but it is up to each province, through its constituted authorities, to discharge this obligation, both to the people and to the doctors, and when this is done, to look to the Federal Government for such assistance as can be proved is needed by the area concerned.

The conference was exceedingly worth-while, and we now feel that the air has been cleared and confusion in the matter can no longer be said to exist.

Payment for medical care of indigents.—At some of the luncheon meetings of the Alberta Medical Association held in September the question of payment of physicians for the care of the indigent sick received much discussion. A resolution was passed in favour of a Dominion-wide campaign by the Canadian Medical Association for assumption by the Dominion Government of the cost of medical relief. The text of this resolution is:

"Whereas under the present economic condition many of our citizens are finding themselves unable to pay for the necessities of life, including medical and allied services; and whereas the various government bodies, municipal, provincial and federal have recognized these conditions, and have acknowledged their responsibility by advancing various forms of relief; and, whereas, in the opinion of this Association, the health of the people is a matter which concerns all these government bodies; and whereas the Dominion Government has accepted certain responsibility for the economic relief of all indigent peoples of Canada; and, whereas, in the opinion of this Association, the principles underlying the provisions of medical relief are practically identical with those underlying the provisions of economic aid; and, whereas, in the matter of the provision of medical services the medical profession of this province which has already been willing to assume the major

share of responsibility for the care of indigent sick, is now finding the burden of so doing exceedingly great;

Be it resolved, that the Alberta Medical Association go on record as endorsing some scheme whereby the medical profession of the province will be assisted in providing adequate medical services for the indigent sick."

Dr. T. C. Routley had during a meeting on the day prior to this asked for a mandate from the members of our Association on this subject, and this was the result.

Dr. G. D. Stanley, M.P., stated that direct relief had been administered by the provinces, assisted financially by the Dominion. If we undertook to ask the Federal Government to institute a system of paying doctors for medical relief for the people of the various provinces then we would be asking something they cannot do under the constitution; administration belongs exclusively to the provinces. Asking for a portion of the money given for relief already extended is an entirely different thing. The medical problem is exclusively the field of the provinces, and the Dominion cannot enter in. Dominion grants to the provinces may be made under certain conditions, but have no administrative authority.

Health insurance.—The Council of the College of Physicians and Surgeons of Alberta will convene district meetings of the medical profession to discuss interim reports of the Provincial Legislature Commission on health insurance, at which representatives of the Council will be present to discuss this subject. Following these meetings a general plebiscite will be taken. While the members of the Council do not approve of state medicine, yet, they are of the opinion that the profession should contribute some worth-while suggestions to the solution of the problem of rendering medical services to all of the people of Alberta. What the future has in store for our profession here no one can foretell. Concerning the present difficult situation in the practice of medicine and all of the details connected with it, the practising physicians are the only ones who have the best knowledge. If the public is well advised they will carefully listen and hold to the advice of those who know. If our physicians are to become civil servants on salary they will have fixed hours of labour. They will be on duty on shifts, or they will be paid overtime. If the state is responsible for the health of the people, will it control the habits of the people, the hours they work, the hours for recreation and for rest?

Men and Books

DOCTORS IN POLITICS

We have to thank Dr. Ross Mitchell, of Winnipeg, for the following excerpt from the *Winnipeg Free Press* of August 28th, 1930, which presents such a tribute to medical men that it merits citation here. [Ed.]

"Medical doctors in Canada often bring the soothingness of their bedside manner to compose the ruffled nerves of a feverish parliamentary assemblage. In Canada, indeed, doctors are frequent occurrences in politics. Every legislature shows its familiar faces of practitioners devoting their time to public affairs at the expense of their practice, and few Parliaments are complete without their row of seats filled by medical men freely advising statesmen. It is thought that doctors are more commonly in politics in Canada than they are in England, but this may be a misconception. Doctors in England, though elected to Parliament, may naturally lapse into that discreet silence which professionally so often is their final word in any crisis. Medical men from Ireland used to earn some fame and create more noise in the British Parliament, but since their visits to Westminster have ceased the medical composition of the House of Commons has been less exhilaratingly vociferous. Perhaps the outstanding medical member to-day is the Right Hon. Christopher Addison, a minister in the Labour Government who was previously a minister in a Lloyd George administration that included Lord Finlay, the Lord High Chancellor, possessing the soundest legal mind of his day, because, perhaps, he was a qualified medical man who had never practised.

What British medical men failed to do politically in their own country some have not been backward in accomplishing in other lands. Two picturesque instances stand out from many. Kaid Maclean ruled Morocco, and Leander Starr Jameson did much as Prime Minister of Cape Colony to bring about that union of South Africa which embraced former foes who would have gladly seen him shot before they became his fast friends.

For some fifteen years the unexcelled parliamentary speaker in the House of Commons at Ottawa was a medical man who in middle life migrated from Newcastle-on-Tyne to western Canada. When "Red" Michael Clark represented the spacious Alberta riding of Red Deer he was a frail and genial character who was without a doubt a master of debate. His was the single expression of the genius. He was almost divinely gifted in purity of language, in the unpretentious academic reach of clear and compelling exposition, and in the singular aptness to convey with superb dignity, and to express felicitously, delicate emotions equally with harsh

resentments. Michael Clark will go down in Canadian parliamentary tradition as a strange wraith, a wonderful speaker who, it seemed, was impotent to engage actively in the stern tasks others less gifted set themselves.

The very opposite was a doctor who made a great name for himself in the history of Canada. Ever since Charles Tupper began the practice of medicine in his native province of Nova Scotia he was known as "The Little Doctor". By the time he was 40 years of age he had established himself in a political career by becoming Prime Minister of Nova Scotia. Then came the movement for Confederation, and none backed it more vigorously, more persistently, or more adroitly, than did Dr. Tupper. He was in the forefront of the campaign, whether the fight was in Canada or at London; and as a framer of the Act of Confederation Tupper had an unquestionable claim to membership in the first Dominion cabinet, but magnanimously withheld his right so that a lesser colleague could be chosen. It is just sixty years since Charles Tupper was president of the Canadian Medical Association, but his subsequent career was exclusively that of a statesman. In him as Finance Minister of the Dominion, and in other offices, including the High Commissionership at London, must be discerned the influence accountable for much of the constructive efforts of the Macdonald administrations. "The Little Doctor" was no mild voice, and for a brief while was Prime Minister of Canada; but for long years he dominated the political situation in the Dominion.

Doctors of humbler attainments, however, have played generous and useful parts in Canadian politics. Their devotion to the field is mainly accidental. Their profession brings them into intimacy with people, so that they get known better than do most men. This, of course, has been very obvious in western life. It has, probably, accounted largely for the election of so many medical men to Legislative bodies. Medical men understand the ills that beset ordinary folk. Their skill in operation, their cunning in healing, never rise above the perception they get into adverse general conditions afflicting those they would serve. It must be because of this deeper, this more intimate, appreciation of the futility of legislation, uninformed of the facts of life, that doctors have quietly exerted tremendous influence among legislators. Nobody can imagine them as a body craving for public life. They are more liable to be called than to call. Illuminating instances may be found in western Canada, without having to go farther; but it may be less invidious to select an example from another Dominion. In the State of New South Wales a surgeon called Page was earning something of a world-wide

reputation for his work in the little town of Grafton. But as he turned his thoughts from his studies and research to the conditions of his fellows around him, he realized the unfair pressure of ill-devised legislation on the farming community. He gave up his medical career, he relinquished his lucrative practice, and went into politics. He founded and led the Country Party, and eventually became Commonwealth Finance Minister in a Government formed jointly with the Nationalists under Stanley Bruce as Prime Minister of Australia.

If you get to know the medical men in politics in Canada you find them mostly actuated by some such impersonal motives. Dr. Robert Thornton left his practice at Deloraine in this province to give to the educational system of Manitoba a thoroughness it lacked, and in that completeness now bodes the promise of its future. The present Minister of Health in Manitoba, the Hon. Dr. E. W. Montgomery, who has officially been prominent in the reception of the distinguished visitors now convened here,* was understood by the laity in general to be admitted by the local medical profession to be its outstanding practitioner when he voluntarily put on the galling harness of departmental duties and accepted a portfolio in a Farmer Government. Dr. William Egbert, of Calgary, comes to the convention as Lieutenant-Governor of Alberta, and in that office succeeded Dr. George Brett, one of the pioneers of medicine on these prairies. Dr. Brett having taken post-graduate work at Vienna, settled first here, assisting in founding the Manitoba Medical College.†

Many doctors, indeed, have gone into politics in Canada. Some were undistinguished, but all were helpful. Some, like Dr. Sproule, so long member for East Grey, rose to be Speaker of Parliament. Or, again going to Grey County, some have been rewarded by affectionate regard such as was given to Dr. Landerkin. For many, many years he was Parliament's most witty, satirical, and kindly commentator; and yet he is recalled as probably never having delivered a formal speech. This is not a list. If it were, it would be long. It would enroll a modest, a genial, and a worthy host of men who healed folk, who charged them for doing so, and who, generally, if not invariably, had to build up again the practice that going into politics had diminished."—Z.Z.

Two other medical men who filled an important place in political life in Canada in their time are mentioned in Dr. Maude E. Abbott's "History of Medicine in the Province of Quebec," page 54, as follows:—

*This refers to the meeting of the British Medical Association in Winnipeg, 1930.

† It may be added that Dr., afterwards Sir, John Christian Schultz was Lieutenant-Governor of Manitoba after being M.P. for Lisgar and a Senator, and Dr. D. H. Harrison was Premier of Manitoba for a few weeks following the death of Hon. John Norquay. Also Dr. J. W. Armstrong was for several years a cabinet minister in the Norris Government.

"Sir Etienne Paschal Taché was born in 1795 at St. Thomas de Montmagny and commenced his medical studies under Laterrière at Quebec, then took a degree in the United States and his provincial licence in 1819. In his earlier life he was a great patriot and a close friend of Papineau, and was deputy for L'Islet in 1840. Later, he embarked on a distinguished political career, becoming Minister of Public Works in 1848 and First Premier of Lower Canada in 1856. He was knighted in 1858 and made aide-de-camp to the Queen with the title of Colonel of the regular army in 1860; in 1864 he formed the Taché-MacDonald ministry and in 1865 presided at the conferences preparatory to the establishment of Confederation. He died that July just two years before the consummation of the Dominion in 1867.

Another medical man who won distinction at the Bar in the middle 19th century was the Hon. Mr. Justice Ruggles Church, Q.C., who graduated in medicine from McGill at the head of his class in 1868, but subsequently qualified as a barrister and became Attorney General of Canada and Judge of the Queen's Bench." [EDITOR.]

THE STUDY OF ANATOMY*

A REVIEW BY SIR ANDREW MACPHAIL

Montreal

This is an ideal book, by an ideal professor, for the ideal student; that is, for the young man who goes to a university "which by her ineffable charm keeps ever calling to the true goal, to the ideal, to perfection;" for the student imagined by Matthew Arnold. But that was seventy years ago. Students now come to a medical school for quite other purposes. They come to qualify themselves to enter upon the practice of medicine, which, again, is quite different from learning "the art." That is learned after the student is gone out into the world, to the bedside of the sick and the suffering. But they will learn from this book that the ideal is the reality in medicine.

The modern student differs, too, from the mediæval,—and from our point of view in medicine the student of seventy years ago lived in a mediæval age. He is now not a boy, but a man of middle age, 23 years old. Seventy out of every hundred in McGill at least have already graduated from universities as bachelors, masters of arts, science or philosophy; their minds closed and little susceptible to counsels of perfection. When they have passed through the lecture room, the laboratory, the clinic, and the hospital, they are old men with thirty years on their whitening heads. It is therefore doubtful that Professor Whitnall can successfully emulate Dr. Arnold, whom he quotes with high approval, who, as Dean Stanley said, was "the elder brother and playfellow of his children." Professor Whitnall may be, as Matthew Arnold wrote of his own father, "cheerful, and helpful, and firm;" but it is doubtful that he will

* The Study of Anatomy. S. E. Whitnall, M.A., M.D., B.Ch. (Oxon.), M.R.C.S., L.R.C.P., F.R.S.C., Professor of Anatomy, McGill University, Second edition, written for the medical student. 93 pages. Price \$1.20. Edward Arnold, London; Macmillan Co., Toronto, 1933.

earn the eulogy of the "Faithful Shepherd who at the end of the day comes, bringing his sheep in his hand."

To mediate between the text-book and experience, to guide, to inspire, to educate is, as Professor Whitnall suggests, the essential function of the teacher; but the whole duty of a medical school is not so esoteric as that. The teacher *can* inform the student, *can* put knowledge into his head, *can* make him think, *can* make him read. To this end he has a powerful weapon in his hand, the examination, more powerful than the birch rod which his exemplar, Dr. Arnold, used so freely. To this laborious process of teaching every professor of the abstract applies in disdain the term "spoon-feed;" and yet in their own feeding they employ this useful utensil three or even four times a day. Osmosis is too tasteless; it will not suffice for the student of medicine either.

The book opens a wide field rich in literature as well as in medicine, into which every student will do well to enter as far as he likes or can; but even the author seems to doubt that he will go the full length. A list of books and articles to the number of 122 for collateral reading or reference is supplied; but those from 78 onwards are recommended for professional colleagues alone. Both classes will be convinced by the book that anatomy is the best process by which a layman can be converted into a physician. They will also discover that the author is a living professor.

In this new edition, whilst maintaining the system of the first one, the author has largely increased the matter and added to the variety of his theme. He first describes the nature and principles of anatomy, and its correlation with the allied subjects of physiology, histology, embryology, morphology and anthropology; particular emphasis is laid upon surface or living anatomy, and attention is drawn to future pathological and clinical interests. He then gives advice on practical methods of study, with notes on special books and articles; and ends with remarks on teachers, lectures, examinations and general reading. A lightness of touch in apt illustration does not conceal the seriousness of his purpose.

Leave future occurrences to their uncertainties, think that which is present thy own; And since it is easier to foretell an Eclipse than a foul Day at some distance, Look for little Regular below. Attend with patience the uncertainty of Things, and what lieth yet unexerted in the Chaos of Futurity. The uncertainty and ignorance of Things to come make the World new to us by unexpected Emergencies; whereby we pass not our days in the trite road of affairs affording no Novity; for the novellizing Spirit of Man lives by variety and the new Faces of Things.—Sir Thomas Browne.

Provincial Association Notes

The Medical Association of the Province of Quebec

The Annual Meeting of the Medical Association of the Province of Quebec was held at the Chateau DeBlois, Three Rivers, on September 6, 1933. Exactly 158 members were present. Without intending to make invidious comparisons, it may be said that the reunion was an unprecedented success, not only from the gratifying attendance and the social attractions but also on account of the high scientific quality of the papers and clinics presented. On the day before the time set for the holding of the general session the President and Council met and heard the different reports that were to be presented and the Executive gave account of its activities during the year. The proceedings were highly interesting on account of the great number of important questions that had to be threshed out, and the meeting disbanded at a late hour.

At nine o'clock, a.m., on September 6th the scientific program was proceeded with at the various hospitals.

On the return to the Chateau DeBlois, and after lunch, the annual general assembly of the members took place. The report of the General Secretary elicited considerable discussion, but was finally adopted after some modification as to the number of the representatives of medical societies who had been delegated to the Annual Meeting held at Hull the preceding year. The reports of the Committee for the Study of Social Assurance and of the Committee on Post-graduate Courses were also adopted. The report of the Hospital Section took up chiefly the activities of the Section in regard to the Law on Industrial Accidents and the creation of a Liaison Committee. This latter question brought out some discussion. All seemed agreed as to the necessity of having such a committee. The name of Dr. Charles Vezina was added to the six names on the committee, as recommended in the report. The Treasurer's report was adopted unanimously.

The General Meeting had manifested a desire to make the Council more representative, inasmuch as its membership was limited to twenty. Accordingly, the Secretary read the following proposed amendment to the regulations:—

"Whereas a certain number of medical men have complained that they were not represented on the Council of the Medical Association of the Province of Quebec; whereas Article 2, paragraph b, of the regulations limits the number of the members of the Council to twenty, exclusive of the President; whereas these members of Council are elected at the Annual Meeting for the term of one year, commencing on the first day of January each year; whereas the election of members of Council by the local medical societies already existing would be more satisfactory to the profession; it is proposed by the signatories to this motion that the five

paragraphs, (a), (b), (c), (d), and (e) of Article 2 of the Regulations, under the caption "Administration", be rescinded and be replaced by the caption "Officers—Administration":

(a) The Officers of the Association are a president, three vice-presidents, a general secretary, a general treasurer, and a president of the Council, who is at the same time president of the Executive.

(b) The Association is governed by a General Council.

(c) The Council consists of

(1) The officers;

(2) Representatives elected by each of the local medical societies. Each medical society has a right to elect to the Council of the Medical Association of the Province of Quebec its president and secretary, and an additional member in the case of a society having 10 to 25 members of the Medical Association of the Province of Quebec; an additional representative for a society having 25 to 30 members; an additional representative for a society having 50 to 100 members; and so on, one representative for each fifty members in excess of 100 members of the Medical Association of the Province of Quebec. All the existing medical societies, even those in the large centres, which hold regular meetings at least once a year, will be regarded as Local Societies. Medical societies, associations, and federations of a provincial character, and those whose members are composed of specialists are not considered to be Local Societies.

(3) The presidents and secretaries of Committees of the Association.

(4) The presidents and secretaries of Sections of the Association.

(5) Past-presidents of the Association will be members of the Council *ex officio*.

In order to avoid any ambiguity the proposers of this motion suggested the addition to Article 3—"Duties of the Officers"—after paragraph f, paragraph g, as follows:—

"The President of Council presides at the meetings of Council and at those of the Executive Committee."

As a consequence of this modification of the regulations, it was suggested that Article 4, which treats of the duties of the General Council and of the Executive Committee, paragraphs a and b, be rescinded and replaced by the following paragraphs:—

(a) The Council shall meet at least once a year, preferably at the time of the Annual Meeting.

(b) Between annual meetings and those of the Council the latter can be called together by order of the Executive Committee. In connection with these extraordinary meetings of the Council notice shall be sent to each member indicating the reason for the meeting. The Executive Committee, should it so desire, instead of convoking the whole Council may refer matters of extreme importance to the members, and obtain their views by correspondence.

(c) The Council transacts all the business of the Association. Before the end of each annual meeting it shall elect its officers, and shall select the place of the next annual meeting.

(d) In order that the conduct of the business of

the Association may be facilitated between annual meetings the Council shall nominate a committee of six, which shall be known under the name of the Executive Committee. The president of the Association, the vice-presidents, the president of Council, the treasurer, the secretary, shall be members of the Executive Committee *ex officio*.

(e) The president of the Council shall also be President of the Executive Committee.

(f) The election of officers shall be by secret ballot on an absolute majority of the members present.

(Signed)

A. T. BAZIN

H. S. SHAW

ERNEST E. TROTTIER.

After some discussion, in which Drs. Boisvert, Sirois, Rhéaume, Desrochers, Bazin, Trottier, Lapointe, Bourgeois and Hetu took part, on the motion of Doctor Godin, seconded by Doctor Charpentier, the amendment to the regulation was carried by a vote of 37 for to 17 against, the requisite two-thirds majority being thus obtained. On the motion of the Secretary, seconded by Doctor Trottier, the regulations were suspended in order to permit of the election of the Executive Committee by the general meeting. Some difference of opinion, however, arising as to the regularity of the proceedings, finally, on motion of Doctor Gérin-Lajoie, seconded by Doctor Gatién, it was decided to retain the existing Executive in office until the next annual meeting.

Reverting again to the program of papers, Doctor Dorval read a valuable communication on the comparative cost per day for the patients in certain hospitals, and was followed by Dr. B. G. Bourgeois, who read another prepared by Dr. L. A. Lessard, Superintendent of the Notre Dame Hospital. These two papers elicited a lively discussion. Doctor Isabelle, of Hull, suggested that hospitals should be reclassified, and he thought it necessary that every magistrate giving an order for relief should consult with medical men before doing so. Doctor Lapointe thought that the various mayors should be informed as to the meaning of the law relating to relief. Drs. Dorval, Isabelle, Bourgeois, Rhéaume, and others spoke successively on this burning question, and, finally, Doctor Bazin moved, seconded by Dr. L. F. Dubé, that the question be referred to the Executive Committee for study, the two papers which had just been read to constitute a point of departure for a presentation which would be completed after considering any other suggestions which might be received through the secretary's office.

At four o'clock p.m. a golf tournament was held at the Ki-8-Eb Country Club, in which twenty members competed. In the evening the customary dinner was held, at which the ladies were present, and the evening was concluded by a most pleasurable trip by steamer on Lake St. Peter. The ladies of the party were entertained at Shawinigan and Grand'Mère by a luncheon

at a fashionable club and by a bridge and afternoon tea.

The cordial thanks of the Association are tendered to the local committee, the ladies of Three Rivers, the medical and daily press, the exhibitors, and the generous donors of prizes, who did so much to make the annual reunion the great success that it was.

LÉON GÉRIN-LAJOIE.

REPORT OF THE SECRETARY FOR 1932

The year 1932 and the beginning of 1933 have taken up the attention of the Executive of the Association and certain of its committees to a considerable extent.

The law relative to the accidents of labour and the project for the establishment of social assurance in the province were the chief items which engaged the attention of the Secretary. No less than six meetings of the Executive, two of the Council of the Association, one of the hospital Council, and two of the Committee for the Study of Social Assurance called forth an activity on the part of your representatives on these various bodies that deserves emphasizing at the annual general gathering. The effective collaboration of the members of these different units has served to protect the interests alike of those practising in rural districts, of those in the large centres, and of those engaged in hospital work.

About ten thousand letters and parcels have been dispatched from the Secretary's office, either to inform the profession as to the activities of the Association or in reply to requests for information, requests which are becoming more and more numerous and of a provincial, national and even international derivation.

1. *The Annual Meeting of 1932.*—This was held in Hull on September 7th of last year, conjointly with l'Association des Médecins de Langue Française de l'Amérique du Nord, which met in Ottawa at the same time. About 300 physicians sat down at the traditional luncheon, at which the reading of the reports of various committees took place. Eighteen local Medical Societies were represented on this occasion. After the presentation of scientific work by Drs. Chevassu, Gabby, and Pepin the report of the Committee for the Study of Social Assurance was submitted, but on account of the diverse opinions expressed about the subject its adoption was withheld until the opinion of each of the local Medical Societies could be ascertained.

2. *A request from the Safety League of the Province of Quebec.*—Through the intermediation of Doctor Baudouin, the Safety League of the Province of Quebec approached us for a grant to meet the cost of publication of an article by Doctor Dubé on "Alimentation", with a view to have it distributed among all the doctors of the province. Your Executive did not see its way to comply with this request,

because of limited resources, and referred those interested to the Provincial Board of Health, which body was particularly concerned with the subject.

3. *Survey of nursing education in Canada.*—At the request of the special committee nominated by the Canadian Medical Association, to select two members from your Association to sit on that committee, your Executive selected Drs. A. T. Bazin and E. P. Benoit for that duty.

4. *Committee on the post-graduate course.*—This committee, whose duties begin on October first of each year and terminate on September 30th of the next, continued its work until September 30, 1932, when the funds which have been forthcoming for the past seven years were discontinued. The report of this committee follows immediately.

5. *Deaths and replacements.*—Dr. Gustave Archambault, member of Council, died during the year and was replaced by Dr. A. LeSage. Dr. A. Brassard also died during the year but his place has not been filled by the Council.

6. *Liaison Committee.*—After the early part of 1932 Mr. Taschereau, the President of the Commission on Industrial Accidents, asked us to appoint a committee which would act as a sort of buffer between the medical profession and the Commission. After considerable correspondence with the similar committee which exists in the Province of Ontario, and after much discussion as to the functions of such committee, we are happy to announce that last Spring a Committee of Liaison was formed, the members of which are agreeable to the Commission and will be, we hope, equally acceptable to the members of the profession.

7. *The Victorian Order of Nurses.*—Dr. J. R. Belisle, of Hull, has represented your Association on the Council of the Victorian Order of Nurses, and the attitude he took in regard to the amendment proposed has been approved by your Executive.

8. *French thermal and climatic stations.*—Your Association was engaged in 1932 in the organization of a trip to the thermal and climatic stations of France, under the auspices of the French Government, but owing, no doubt, to the existing financial situation no one from Canada took advantage of the opportunity. The high cost (\$935 in American funds) apparently was prohibitive for the Canadian physician.

9. *Modification of the By-laws.*—In order to permit of a greater representation of the various local medical societies on the Council of the Medical Association of the Province of Quebec the new Executive was charged with the duty of considering a modification of the regulations in this particular, to present a report at the Annual Meeting at Three Rivers in 1933.

10. *The Hospital Section.*—The Hospital Section created at the end of 1931 has continued to study particularly the Law relative to Industrial Accidents and has proposed different amend-

ments the nature of which you will learn later. This Section, also, it may be remarked, had to do with the creation of the Liaison Committee.

11. *Committee for the Study of Social Assurance.*—In the course of the year your Committee went into this matter very fully and presented its report towards the end of 1932. Thanks to the cooperation of the large majority of the local medical societies, this Committee has had numerous interviews with your representatives.

12. *College of Physicians and Surgeons of the Province of Quebec.*—This College applied to us for a complete list of the medical societies of the province, for their information.

13. *The law relating to industrial accidents.*—Your Association delegated, under different circumstances, certain of its officers to appear before the Government and also before the Industrial Accidents Commission for the purpose of protesting against certain amendments to this law which were being proposed. In spite of the united efforts of your representatives as well as those of other provincial and local medical societies the law, amended as proposed, was passed.

14. *Income tax.*—The Canadian Medical Association has asked our cooperation in order to obtain, if possible, an increase in the amounts deductible in the case of physicians' incomes.

15. *Possible remuneration of the physician treating patients under direct relief.*—Your Association was represented before the Prime Minister on this matter, which has to do with the interpretation of the Federal law. At the meeting of the Council of the Canadian Medical Association at Saint John, N.B., at which your secretary was present, the hope was expressed that the request of the Canadian Medical Association, supported by that of the provincial medical societies, namely, that medical care should be included among the items of chief importance to the beneficiaries, equally, that is to say, with housing, heating, clothing and feeding, would bear the fruit that we hope for,—the authorization of the Federal Government to the Provincial Government to utilize the funds provided by it for defraying the cost of medical service to the unemployed.

16. *Health Statistics.*—A request came to us from France from the Director of the review "L'Hygiène Sociale" for detailed figures relative to the personal health of persons living in Canada. We replied that we regretted not being able to supply these.

17. *Tenth annual report of the Provincial Health Service.*—The Secretary has received Dr. Alphonse Lessard's extremely interesting report on the activities of this service during 1932. After consideration by the Executive Committee it was decided to request the Prime Minister to send copies of this report to all the physicians of the province, in the belief that

this would be a useful undertaking. Unfortunately it was found that the reprinting of the report would be too costly an undertaking, and consequently the profession has been deprived of the benefit of it. We have expressed the hope that in the future the Annual Report of the Health Department will be sent to all members of the profession.

18. *The narcotic law.*—A considerable interchange of correspondence has been held with the Chief of the Bureau of Narcotics at Ottawa on the subject of the possible prohibition of the sale of heroin. An enquiry has been conducted confidentially with the hospitals and wholesale and retail pharmacists and the information received has been forwarded to the Narcotic Division of the Bureau of Pensions and National Health. Opinion was favourable not only to the restriction of the manufacture of heroin but also to its total abolition and exclusion from the various British pharmacopœias in use and the French codex.

All of which is respectfully submitted.

LÉON GÉRIN-LAJOIE.

General Secretary

REPORT OF THE COMMITTEE FOR THE STUDY OF SOCIAL ASSURANCE

Social assurance was made the subject of a special study by a committee representing the various medical societies, under the joint presidency of Drs. A. T. Bazin and Albert LeSage.

The Committee, first of all, presented before the Commission a preliminary report which was submitted to you at the last annual meeting. From this report was derived the idea of the payment of the cost of medical care through a third party. After consideration, this idea was discarded, and the majority of the members present at the meeting on November 30, 1932, at which some fifteen medical societies were represented, recommended that the payment for medical services should be made directly by the client to the physician, and on each occasion that the client had need of medical care. Further, the Commission asked your Committee to let them know what maximum and minimum amounts taken from the annual revenues should apply to those persons who would be likely to fall under the provisions of the Social Assurance Act, should this eventually be recommended in the province. Your representatives have appeared three times officially before the Commission and have also met one or more of the Commissioners at various times. The work of the Committee, for the time being, has partly come to an end, owing to the report which the Commission presented last Spring. The very important matter of the medical tariff remains to be considered. We believe that this Committee will become permanent and that it will remain open to suggestions on this matter, and that it will follow very closely the action of the

Government which has received favourably the report of the Royal Commission.

All of which is respectfully submitted.

LÉON GÉRIN-LAJOIE.

REPORT OF THE HOSPITAL SECTION

The Hospital Section has studied particularly the question of the law relating to industrial accidents.

The Hospital Section was founded in 1931 for the purpose, more particularly, of looking after the interest of physicians working in hospitals. The matter that was most obnoxious to this group of practitioners was the law relating to industrial accidents. Dr. A. LeSage was chosen president of this Section, which met frequently so as to make a full study of the new law of 1931 and its mode of operation. Doctor Bélanger, the chief medical officer of the Commission, took part in some of these meetings and we appreciated the special knowledge which he was able to bring to the consideration of this matter. Form M-12 of the Law elicited much comment, and on the suggestion of your Section certain modifications were adopted.

After the Law had been in operation one year the Government was dismayed by the considerable deficit which the operation of the Commission on Industrial Accidents entailed and it was proposed that the free choice of doctor by the injured person should be abolished. It was hoped that by this means the amount of the deficit would be somewhat reduced. In spite of the conjoined efforts of the medical members of parliament, the Medical Association of the Province of Quebec, and the Federation of Medical Societies, the free choice of doctor was abolished, but in a somewhat mitigated fashion. Finally, a Liaison Committee was created, to serve as a sort of buffer between the medical profession and the Commission. This Committee was created on the suggestion of your Executive, which had had the thought in mind for two years, and it has the assent of the Commission.

The members of this Committee are Drs. A. T. Bazin, Montreal, B. G. Bourgeois, Montreal, P. C. Dagneau, Quebec, A. Rousseau, Quebec, F. A. C. Scrimger, Montreal, and E. Trottier, Montreal.

All of which is respectfully submitted.

LÉON GÉRIN-LAJOIE.

REPORT OF THE COMMITTEE ON POST-GRADUATE COURSES

The Committee on Post-Graduate Courses reports success in all the districts visited during the term 1931-32. As in former years, practically the whole of the province has been covered, from Lake St. John to the City of Quebec. Three Rivers and Hull, without forgetting Abitibi, on the north side of the River St. Lawrence, and Valleyfield, Farnham, Drummondville, Montmagny, Rivière-du-Loup and

Gaspé on the south side. Briefly, 25 meetings took place, in 22 different localities, before 917 physicians. Eighty-five conferences were held by 75 speakers, at a cost of \$5,421, an approximate amount of \$1.09 per doctor per meeting.

The sum of \$5,000 allotted to the Committee has been withdrawn, but since there had been a small surplus remaining over from the previous year the central Committee on the Post-Graduate Courses undertook to meet the deficit.

In conclusion, the Committee of the Post-Graduate Courses of the Province of Quebec desires to express to the Sun Life Assurance Company the sincere thanks of the whole medical profession for their generous donation which has permitted these conferences to be held. It is to be regretted that this subscription has not been obtained this year. At the same time we dare to hope that when better times come we shall be able to continue the activities of this Committee, or at least that the profession, recognizing the value of these courses, will itself advance the amount necessary for their continuance.

The following Table gives a summary of the activities of the Committee during the past seven years.

Year	Lecturers	Lectures	Reunions	Auditors	Average
1926	60	100	25	423	17
1927	40	61	20	408	24
1928	48	89	24	610	26
1929	40	61	17	384	23
1930	34	59	19	400	22
1931	38	61	27	831	31
1932	75	85	25	917	36
Total	335	516	152	4,033	26

All of which is respectfully submitted.

LÉON GÉRIN-LAJOIE.

The Saskatchewan Medical Association

The Annual Meeting held at Regina, August 28th to 30th, was an unqualified success. Over 150 members registered. The papers given were "The nasal catheter in pædiatrics—Practical uses in rural and hospital practice," by Dr. J. Lloyd Brown, Regina; "A way of life for the general practitioner," by Dr. D. C. MacRae, Arcola; "Some clinical aspects of intravenous infusion," by Dr. E. K. Sauer, Regina; "Some general principles in the treatment of fractures," by Dr. J. E. Lehman, Associate Professor of Clinical Surgery, University of Manitoba, Winnipeg; "Scarlet fever," by Dr. J. D. K. Lindsay, Lumsden; "Trauma and disease," by Dr. Egerton L. Pope, Professor of Medicine, University of Alberta; "The surgical treatment of tuberculous empyema," by Dr. R. H. MacDonald, Saskatoon; "The breast" (illustrated with lantern slides), by Dr. J. C. Bloodgood, Baltimore, who attended the meetings under the auspices of Hon. F. D. Munroe, Minister of Public Health and Chairman of the Saskatche-

wan Cancer Commission; "Actinomycosis; a review of twelve cases," by Dr. Egerton L. Pope; "Reflection on present-day surgical trends," by Dr. J. E. Lehman, Winnipeg; "The general treatment of cancer," by Dr. J. C. Bloodgood; "What everybody should know about cancer," by Dr. J. C. Bloodgood.

A report of work done by the Committee on Health Insurance was given by Dr. S. E. Moore. The executive and council were asked to go into the question of municipal contracts. It was decided to incorporate the Saskatchewan Medical Association. The executive was empowered to proceed with this project. Next year's meeting is to be held in Prince Albert National Park.

The executive met on September 10th, in Regina. They were joined by Dr. T. C. Routley, and Mr. Wickens, of Moose Jaw, attended as legal counsel. The incorporation was proceeded with and a constitution drawn up. The following officers were elected:— *Honorary President*, Dr. D. S. Johnstone, Regina; *President*, Dr. George Lee, Shaunavon; *First Vice-president*, Dr. H. H. Christie, Esterhazy; *Second Vice-president*, Dr. D. P. Miller, Prince Albert; *Secretary-Treasurer*, Dr. A. MacG. Young, Saskatoon.

Medical Societies

The Academy of Medicine, Toronto

The Annual Dinner and Stated Meeting of the Academy of Medicine, Toronto, was held at the Royal York Hotel on October 3rd at 7 p.m. Two hundred were present. The new president, Dr. E. A. McDonald, presided and among the invited guests were included His Honour the Lieutenant-Governor of Ontario, Dr. Herbert A. Bruce, the Right Hon. Sir William Mulock, the Hon. George Henry, Hon. Dr. J. M. Robb, Hon. Dr. Murray MacLaren, Hon. Mr. Justice Riddell, President H. J. Cody, His Worship the Mayor of Toronto, Lord St. Audries, Dr. R. E. Wodehouse, Dr. Ross Millar, Dr. F. C. Neal, Dr. G. A. B. Addy, and Dr. W. O. Stevenson.

Following the dinner, short speeches were delivered by some of the distinguished guests, and a musical program was presented by one of the Fellows, Dr. Harvey Doney. The immediate Past-president, Dr. R. S. Pentecost, was presented with a replica of the Presidential Badge by Dr. T. C. Routley through whose generosity these replicas are provided.

An event of unusual interest was the presentation to the Academy of the portrait in oils of Dr. John Ferguson. The donor, Mrs. N. C. Stephens, was present and made the presentation, assisted by her daughter, Miss Helen Stephens. Following the unveiling, Dr. Ferguson spoke briefly and feelingly of his affection for

and interest in the Academy. He received warm applause from his hearers, who always look forward to his speeches, so full of brilliant classical references.

The Vice-president, Dr. Malcolm Cameron, took the chair and called upon the President to deliver his inaugural address.

Dr. McDonald dwelt upon the great importance of the Academy as a centre of scientific medical thought in the community, and outlined the program for the coming months. He also went very thoroughly into the present financial condition of the profession as a result of the continued depression, and outlined a scheme for "State Medicine" which he felt had become almost a necessity. His address was well received by the Fellows and later received favourable comment in the Press.

GILBERT PARKER,

Honorary Secretary.

On Oct. 3rd, the Guelph Medical Society held its annual meeting, at which time the following officers were elected:—*Honorary Presidents*—Drs. Henry Howitt, E. McCullough, Harvey Clare; *President*—Dr. R. W. Kramer; *First Vice-president*—Dr. W. A. Proud; *Second Vice-president*—Dr. J. H. King; *Secretary-treasurer*—Dr. A. B. Ritchie.

The Halton County Medical Society held its annual meeting and dinner at the Milton Inn on Sept. 27th, when addresses were delivered by Dr. John Oille, of Toronto, and Dr. W. R. Campbell, of Toronto.

Officers for the ensuing year were elected as follows:—*President*—Dr. H. A. McColl, Milton; *Vice-president*—Dr. W. M. Wilkinson, Oakville; *Secretary-treasurer*—Dr. C. V. Williams, Georgetown.

The Moose Jaw and District Medical Society

The Moose Jaw and District Medical Society were hosts to the doctors of Regina and the surrounding country on September 23rd. In the morning clinics were held at the Moose Jaw City Hospital by Dr. J. C. Meakins, Montreal, and Dr. Roscoe Graham, Toronto. The luncheon meeting was addressed by Dr. T. C. Routley and by Dr. Grant Fleming. In the afternoon Dr. Roscoe Graham gave an address on "The gall bladder." He emphasized the fact that a gall-bladder operation is seldom an emergency measure, that the galactose test is of great value in differentiating hepatitis from jaundice due to obstruction; he showed how easy it was to miss the presence of stones in the common duct and illustrated a method of searching for them. Dr. Meakins gave a lecture on "The rheumatic heart." He compared rheumatic heart disease to the generalized infection of syphilis and of

tuberculosis. He related prognosis, after 20 years of age, to the amount of heart enlargement and distress on exertion. If the heart is not enlarged beyond the nipple line the outlook is good.

The Regina Grey Nuns' Hospital

Dr. Massig, senior interne at the Regina Grey Nuns' Hospital, presented three cases at the September staff meeting on which he had performed autopsies. The first was a case of ruptured gastric ulcer in a man who was a patient of Dr. D. C. Hart, and had refused surgical intervention when the ulcer was discovered eight years ago. The second was a boy who died of a rheumatic heart, a case of Dr. Ritchie's. He had an acute attack imposed on a chronic condition. The third was a case of Dr. D. S. Johnstone's, a baby, aged six months, an illegitimate, premature, Indian child who had not had contact with the mother after birth. It died of miliary tuberculosis. The source of infection was supposed to be a nurse in training who is now being treated for tuberculosis.

At the annual meeting of the South Waterloo Medical Society, held in the Galt Hospital on Sept. 15th, the following officers were elected for 1933-1934:—*President*—Dr. J. H. Howell, Galt; *Vice-president*—Dr. W. L. Catherwood, Galt; *Secretary*—Dr. L. H. Douglas, Galt; *Treasurer*—Dr. G. E. D. Wilson, Ayr.

University Notes

Dalhousie University

Registrations in the Faculty of Medicine at Dalhousie University have closed, and a tabulation of results show that the first year class is the largest in the history of the medical school.

As compared with last year's entering class, the enrolment of the present class is approximately forty per cent greater. Out of a total enrolment of fifty-five students, thirty-nine completed their pre-medical education at Dalhousie, fourteen at other colleges and universities situated in the Maritime Provinces and Newfoundland, including Acadia, Mount Allison, St. Francis Xavier, and Memorial College at St. John's, Newfoundland, while the remaining two students were admitted as graduates of Tuft's College, Medford, Mass., and Colby College, Me. It is also of interest to note that there is an increase of twelve students from the Maritime Provinces as compared with last year's class. During the past few years the number of women medical students has steadily decreased in most medical schools, and, following this trend,

Dalhousie shows one lone registration of a woman student.

While the minimum requirements for admission are two years of pre-medical work at an approved college or university, the records of this year's class show that nearly two-thirds of the students have had three or more years of college training, and several possess a Bachelor's degree.

Dr. A. L. McLean, a former graduate of Dalhousie University, who afterwards took the D. P. H. from Johns Hopkins University, and has spent the last four years as Director of the Henrico County Health Department, Virginia, is here as assistant in Preventive Medicine, and also Epidemiologist to the Provincial Health Department.

N. B. DREYER.

McGill University

October 6th was "Founder's Day" at McGill University, marking the anniversary of the birth of James McGill. The celebrations this time were of more than ordinary importance, for, in addition to the usual Fall Convocation, His Excellency the Governor-General, who is the official "Visitor" of the University, was present with Lady Bessborough to attend Convocation and lay the corner stone of the new Neurological Institute.

Their Excellencies were welcomed at the entrance by Sir Arthur Currie, Principal and Vice-chancellor of the university as the blue and gold ensign of the Canadian Governor-General rose to the flag-staff, and the vice-regal party accompanied by Captains E. C. Colville and A. Lascelles, A.D.C's., entered the east wing for robing.

Moyse Hall presented a brilliant scene as the academic procession filed into the hall, filled to capacity. A total of 41 candidates for degrees in the various faculties led the procession. Bishop Farthing opened the convocation proceedings with prayer followed by the address of welcome to His Excellency by the Principal and Vice-chancellor. Lord Bessborough replied and then came the conferring of degrees, and finally the Founder's Day Address, delivered by Sir Arthur Currie.

Following the convocation Governors of the university and guests, including His Excellency, were driven to the Mount Royal Club, where the Governors entertained at luncheon prior to the ceremonies at the new Neurological Institute.

His Excellency, in the afternoon, laid the cornerstone of Montreal's newest centre of medical research, the Neurological Institute. Those present at the ceremony included Governors of the university, members of the staff, representatives of sister universities, and the City of Montreal and the Provincial Government. Guests of the Governors at a luncheon in the Mount Royal Club formed in academic procession

shortly before 3 o'clock at the McGill Medical Building and the brilliantly robed assembly started its march to the Neurological Institute shortly thereafter.

In the course of his remarks, Principal Sir Arthur Currie took occasion to say:—

"May I once more, on behalf of the Governors of McGill University, her affiliated hospitals and her medical school, publicly acknowledge the generous gifts of \$1,232,652 from the Rockefeller Foundation, of \$20,000 a year from the Provincial Government, of \$15,000 a year from the City of Montreal, of \$100,000 from Sir Herbert Holt, President of the Royal Victoria Hospital, Governor of McGill University, and \$100,000 from J. W. McConnell, Governor of McGill University and of the Royal Victoria Hospital, of \$25,000 from Walter Stewart, also a Governor of the University and of the Royal Victoria Hospital, of \$64,000 from anonymous donors whose initial contributions and guarantees had much to do with the whole development of this important branch of Medicine and Surgery. There were lesser amounts, but not less gratefully received, from the late J. M. McIntyre, Howard Murray and Acosta Nichols, while the Ottman family of New York, gratefully recognizing the skill displayed in an operation on one of theirs, and anxious to encourage the work of Dr. Penfield and his associates, have contributed \$75,000."

In the cornerstone were placed copies of seven daily newspapers of Montreal, including *The Star*, a copy of the charter of McGill University, a copy of the charter of Royal Victoria Hospital, letters between the University and the Rockefeller Foundation, letters between the University and the Government at Quebec, an agreement between the University and the City of Montreal, the annual report of the University for the year 1931-32, the annual report of the hospital 1931-32, the announcement of the Faculty of Medicine, 1933-34, and a copy of the *McGill News*.

The ceremony was followed by a visit of His Excellency to the tomb of James McGill, founder of the university, in front of the Arts Building, where he inspected and received the salute of the guard of honor posted there by the Canadian Grenadier Guards, of which James McGill was the first colonel.

From the Arts Building His Excellency proceeded to the Royal Victoria Hospital where he unveiled a tablet erected to the memory of Sir Vincent Meredith, former president of the hospital, and to Lady Meredith.

Dr. Thomas Forest Cotton, of London, a member of an old English-speaking family in the Eastern Townships of the Province of Quebec, and a former member of the Canadian Army Medical Corps, has been appointed to represent McGill on the executive council of the Universities Bureau of the British Empire.

Special Correspondence

The Edinburgh Letter

(From our own Correspondent)

The problem of the slums is being vigorously tackled in Scotland. Public opinion will no longer tolerate the conditions that exist in many of the towns, and Local Authorities are busily engaged with schemes for the re-housing of persons who are to be displaced from uninhabitable houses. In the country districts, also, much is being done to improve the housing conditions of rural workers. This is very necessary, and should prove of value not only as a factor in promoting health but in helping to check the flow of the population to the towns. Ayrshire County Council, for example, intends to erect 2,500 houses in various parts of the county during the next three years. In Edinburgh the demolition or reconstruction of old properties in the Canongate, Cowgate and Grassmarket has done much to improve the appearance of the "Old Town", and new housing schemes have been carried out in the Prestonfield and Corstorphine districts.

Sir George Newman, Chief Medical Officer of the Ministry of Health refers to the slum problem in his annual report which was recently issued. He says "the slum is beyond all question body-destroying and soul-deadening; it breeds disease and it encourages vice, and it is peculiarly mischievous and dysgenic to child life. Until we can abolish the slum dwelling and the slum dweller we cannot hope to establish securely the national credit of good health." Regarding nutrition he points out the importance of educating the public in buying the proper kind of food, and deplores the ineptitude which is so common in preparing food for the table. He emphasizes the importance of the recognition of the fact that some of our commonest diseases are directly due to deficiency or excess of certain food constituents. Attention is also drawn to the danger of manufacturers exploiting the results of recent researches regarding vitamins, by adding vitamins empirically to a variety of foods without due consideration as to the possible results of such a practice.

Though distances in Scotland are short as compared with the vastness of Canada many parts of the Highlands and Islands of Scotland are more or less inaccessible by the more ordinary means of transport. A considerable development of aerial services is, however, taking place, and the importance of the material saving in time thus effected is proving of great value in connection with the medical services. As an illustration of this an urgent request was received the other day from a doctor in the island of Islay for an aeroplane to take a case to a hospital in

Glasgow. The aeroplane accomplished the journey from Islay to the landing ground on the outskirts of Glasgow in thirty-six minutes. The time occupied by the rail and steamship services is over eight hours. In view of this very material saving in time, the County Council of Argyll have been asked by the Department of Health for Scotland to consider the question of providing facilities for the transport by air of patients from outlying districts who may be urgently requiring hospital treatment. The mountainous nature of the country presents some difficulty in the way of finding suitable landing places. On one occasion when a sick man was being taken from Glasgow to North Uist it was impossible to discover a landing place. Several attempts were made to land in fields near the man's home, and, ultimately, it was decided to land on a stretch of sand some distance from the patient's house. The landing was made safely, but then commenced a race with the tide which was rapidly advancing. The stretcher-bearers carried the patient to his home, and, after seeing him in bed, hurried back to the plane just in time to take off before the waves swept over the spot where the machine had been standing.

Prof. Thomas J. Mackie, Professor of Bacteriology in the University of Edinburgh, has been honoured by being appointed a Corresponding Member of the Royal Academy of Medicine of Rome. Professor Mackie, who was appointed to his present post in 1923, came to Edinburgh from South Africa, where he was Wernher-Beit Professor of Bacteriology in the University of Cape Town.

Prof. Thomas Kirkpatrick Monro, M.D., Regius Professor of Medicine in the University of Glasgow, has just published a volume entitled, "The Physician as Man of Letters, Science, and Action". The volume bears witness to the enormous amount of work which has been spent by Professor Monro in gathering together, from many sources, the doings of medical men who have become known for other reasons than their repute as doctors. The range of subjects dealt with bears eloquent testimony to the diversity of talent to be found in the members of the profession. The book will be of interest not only to medical men but to a wider public.

To illustrate the principle, and to remove a popular misconception to the contrary, that expense by itself is no bar to the supply of proper and sufficient medicines under the National Health Insurance Acts, a case is quoted in the annual report of the Drug Accounts Committee for Scotland in which an insured person received from May, 1929, to December, 1932, medicine to the value of £235. During the four years, the patient received insulin to the value of £112, and liver extract, which was also required, involved an expenditure to the Drug Fund of £120.

The London Letter

(From our own Correspondent)

"The exceptionally good health of the English people continues to be maintained." With these words Sir George Newman begins his conclusion to the Annual Report on the State of the Public Health for 1932. In view of the economic situation and the distress experienced in many areas this authoritative statement must come as a surprise, and it is certainly in conflict with many statements made by investigators approaching the matter by other channels, such as the "Save the Children Fund", which found more evidence of malnutrition than the present report would allow. The facts contained in the report, however, can only bear one interpretation, namely, that so far no markedly adverse affects are to be observed for the country as a whole. The infant mortality rate—accepted as a delicate index of communal well-being—continues its downward course and is actually a point lower than in 1931. The general death rates for different parts of the country do not show any aggregation in those areas where unemployment is most marked, and from this, together with reports from medical officers of health and special reports supplied by health insurance medical officers in different parts of the country, it is concluded that there is no medical evidence of any general increase in physical impairment, in sickness or in mortality, as a result of economic depression or unemployment. The first obvious question is how has this been possible? A visiting officer from the health division of the League of Nations summed it up recently by saying that the medical machinery was available for such an emergency and it was being used. School meals and extra milk for the school children must obviously play an important part in preventing malnutrition, for example. But the report is not by any means solely devoted to complacent satisfaction. There are risks in the future and on the social side there are the factors of deprivation, hardship, anxiety and mental strain. There is evident an undercurrent of forewarning of the possibility of risk of mental instability in the adult man and prolonged undernourishment in women and children. It is obvious that such dangers must be faced. To deal with the former an organization is springing up, known as the Grith Fyrd (Peace Army) Camps. One such camp in the New Forest is proving a great success. It consists of a community of fifty unmarried men who receive no wages, but sign on for 18 months of camp-life during which time they enjoy a very varied series of educative experiences. The financial side is well worked out and the whole scheme has a solid basis of great value.

There has recently been an important Canadian visitor to London in the shape of the film "Damaged Lives" which, it is understood, was produced in Canada under the auspices of the Canadian Social Hygiene Council. Exhibited at what used

to be one of the largest variety halls in the city, it has been attracting huge audiences. This is admittedly the first step in health propaganda—to get hold of an audience, and the next step is to get the necessary information “across”. Reports from those who have seen the film vary very much. It is certainly well produced, but there is still too much emotionalism about the whole subject, and too much stress is laid on the terrible end-results of syphilis. The lecture after the film, with moving diagrams, has much more to commend it, since to many members of the audience this probably represents the first instruction in matters of sex they have ever received from any competent source. In this respect it is disappointing to find that the latest edition of the special handbook on health education prepared for teachers and others by the Board of Education contains no reference to sex education. Mothercraft, but not motherhood, is to be included in the syllabus, and while some mention is made of general biology the obvious path of approach to sex problems is not explained. As long as ignorance of such matters is fostered in the young such films as those mentioned above will be necessary.

The British Association, meeting in Leicester, has produced its annual crop of sensations for the lay press. The medical profession can, however, be rightly proud of the high standard set by those members who have taken part in the proceedings. The President, Sir Gowland Hopkins, delivered a fascinating address on certain aspects of cell chemistry. Tracing the chemical structure of such substances as vitamin D, œstrin, and cancer-producing tar, he was able to show strikingly how molecular rearrangements of the sterols link together such apparently diverse disorders as rickets and malignant disease. Prof. E. D. Adrian spoke of the activity of nerve cells, dealing especially with the results of his recent striking investigations of the electrical changes in nerve tissue. Another interesting topic from the medical aspect was found in a paper in the section of psychology in the use of narcosis in the treatment of anæsthesia.

ALAN MONCRIEFF.

London.

GAUDENDUM CUM GAUDENTIBUS

As lute to lute in harmony attun'd,
Vibrates in glad response, as though it shar'd
The joy that thrills the other's waken'd strings;
So let thine heart responsive share the joy
Thy neighbour feels; nor look with sullen eye
On eyes where gladness beams. Learn thou from this
To share in the delight which others feel,
And banish rankling envy from thy breast
When fortune smiles upon thy fellow man.
Learn thou from this no less his grief to soothe
With brotherly response; for just as joy
Gains increase more from that which it bestows,
So grief grows less, lull'd by the soothing tones
Of Pity's kind compassion for her woes.—Richard Pigot.

Abstracts from Current Literature

Medicine

The Clinical Significance of the Systolic Murmur. A Study of 1,000 Consecutive “Non-cardiac” Cases. Freeman, A. R. and Levine, S. A., *Ann. Int. Med.*, 1933, 6: 1371.

These authors undertook to determine the frequency with which systolic murmurs were present in the routine examination of a large and unselected group of patients, and to analyse conditions under which they were found. Cases in the medical wards were included in the study to only a small extent. Murmurs were graded according to intensity. A murmur of grade one intensity is the faintest bruit that can be definitely heard. It must have appreciable duration after the first heart sound, and is not to be confused with a prolonged first sound. A murmur of grade two intensity corresponds to what the general physician would term a faint systolic murmur. Twenty per cent of the patients studied proved to have systolic murmurs of grades one and two.

The murmur was twice as common in females as in males. It was least common in males between 20 and 49 years of age. In males over 19 years of age the murmur occurred more frequently at the apex than at the base of the heart, while in females, and in males under 19, the reverse held true. On the whole, murmurs were most common and loudest at the base of the heart, with the patient recumbent, and least common and faintest at the apex with the patient upright. Systolic murmurs appearing at the base of the heart during held expiration, and those appearing after effort, when not present before the test, the authors believe to be of absolutely no significance.

Of the 196 patients who had murmurs of this mild degree, 40 had hypertension, 13 had a red cell count under 3.5 million, 9 had hyperthyroidism, 12 had a definite past history of acute rheumatic fever or chorea, and 16 had a suspicious history of a previous rheumatic state. There were 12 with a past history of scarlet fever. The authors believe that all the above factors may have some relation to the murmurs present. There were 18 cases with definite organic heart disease. There were 19 cases over 50 years of age in which none of the above factors except age, were present. In some of these, no doubt, cardio-vascular disease existed but had escaped detection. In 29 patients it was possible that tertiary syphilis, leukæmia, displaced heart, etc., had a bearing on the production of the murmur. There remained, however, 45 patients with a systolic murmur, in whom not even these additional factors were present. Most of these murmurs were of grade one, and the majority were present at the base of the heart in females. These murmurs can

rightly be called "functional" or benign, although many of the other systolic murmurs that had a definite clinical cause (such as hyperthyroidism, anaemia, etc.) might also be called functional in the sense that the valves were not diseased. The systolic murmur need not indicate serious disease, nor disease of the heart, but a systolic murmur of greater intensity than grade one should be regarded with suspicion, and its proper interpretation will lead to more intelligent diagnosis, prognosis, and treatment.

H. GODFREY BIRD

Gallop Rhythm and the Physiological Third Heart Sound. Wolferth, C. C. and Margolies, A. N., *Am. Heart J.*, 1933, 8: 441.

The observations of the authors were made in an attempt to clarify the disagreement apparent in the literature concerning the characteristics and significance of gallop rhythm and its relation to the physiological third heart sound. The report consists of a study of 70 cases of which 60 were classified as having gallop rhythm and 10 physiological heart. The criterion for differentiation is the status of cardiac function. Any obvious alteration in the cardiac function arbitrarily classifies the sounds as gallop sounds. Both are accentuated by the same procedure and have the same time relations, quality and intensity and the positions of maximum intensity are identical. In all cases without exception both sounds were found to fall into either the protodiastolic or auriculo-systolic time zone. It is proposed that the type of gallop which occurs as a result of coincidence of protodiastolic and auriculo-systolic phenomena be called "summation gallop." It was noted that a gallop sound appeared or suddenly became loud when the rate was such that auricular systole was superimposed upon the preceding protodiastolic period.

A scheme of classification is submitted, modified from that of Potain, dividing both physiological third heart sounds and gallop rhythm into protodiastolic, presystolic, and summation forms. The so-called mesodiastolic gallop is discarded. Errors encountered in differential diagnosis were the opening snap of mitral stenosis, mid-diastolic murmur, presystolic murmur, reduplicated first or second sound, pericardial friction rub, mid-systolic click and so-called systolic gallop rhythm. Only in occasional cases will accurate timing requiring graphic methods be necessary. W. H. HATFIELD

The Electrocardiographic Changes Following the Ligation of the Small Branches of the Coronary Arteries. Fowler, W. M., Rathe, H. W. and Smith, F. M., *Am. Heart J.*, 1933, 8: 370.

This paper gives the results of experimental observations made on a series of dogs to determine the electrocardiographic changes following

the ligation of the small branches of the coronary arteries. It was found that the changes in the T wave were the most characteristic features. The various stages in the evolution of these alterations were associated with fairly definite pathological findings. There did not appear to be any definite correlation between the location of the lesion and the type of electrocardiogram. Ligation of a vessel on the posterior surface of the left ventricle produced in each instance a negative T wave in all leads. The closure of a vessel on the anterior surface however produced a variable change, in some instances the T wave becoming negative in all leads, while in others a negative T wave occurred in leads 2 and 3 or lead 1 alone. In cases where the pericardial sac was only opened, then closed without ligation of a vessel, a negative T wave was the rule, occurring in 6 out of 7 dogs and was negative in all three leads in one. Changes in the R-T and the S-T segments were not a prominent feature. They occurred in both the pericardial and ligation experiments. The experiments tend to show that the T wave is primarily concerned and that the changes in the R-T segment are secondary to the latter manifestations. It was found that the return of the electrocardiogram to normal was associated with complete replacement by fibrous tissue. In each instance the alteration in the deflection was associated with a lesion of the myocardium, even in those cases where only incision of the pericardium was done. Serial electrocardiograms will show minor damage of the myocardium which might not be recognized otherwise. This is particularly applicable in coronary artery disease. W. H. HATFIELD

Surgery

Pancreatic Lithiasis. Sennett, S. N., *Brit. M. J.*, 1933, 2: 3.

Pancreatic lithiasis is a rare condition. The majority of cases occur in men, and between the ages of 30 and 50. From 1 to 300 calculi may be present; usually there are from 5 to 10. They are not faceted. They vary in size from sand to masses the size of a walnut. They may be smooth or rough, soft or hard, and white, brown or yellow. Calcium carbonate, phosphate, and occasionally oxalate, are the chief constituents. As these do not occur in pancreatic juice an inflammatory origin is suggested. Rarely do pancreatic calculi consist of organic substances.

Calculi probably never form in a healthy pancreas. They are likely the result of a primary inflammatory change in duct and gland, followed by stasis or invasion by bacteria as a secondary factor.

The most frequent and important symptom is pain, which is usually epigastric, may be dull and continued, or colicky, resembling biliary

colic. It is worse after food, and gradually becomes worse until the patient is afraid to eat. It may be associated with vomiting, hiccup, tachycardia, cold sweat, and collapse. Pain may radiate to the left shoulder region or to the left lumbar region. Many of the cases recently recorded have complained of dull, continuous epigastric pain, worse about ten minutes after a meal. After an attack of colic the stools should be searched for calculi.

The passage of a pancreatic calculus may result in temporary jaundice. Glycosuria is an occasional finding. Changes in the stools are not very frequent. Fatty stools were found in some cases; undigested muscle fibres were less frequent. Calculi are occasionally present and are recognized because of the absence of bile.

Pancreatic lithiasis has been diagnosed during life on several occasions. The diagnosis has been made radiologically in some instances. After suggestive colic the stools should be examined. The absence of faceting of concretions containing calcium carbonate is suggestive.

The treatment consists in the operative removal of the calculi. In most of the recorded cases this has given excellent results. Extensive fibrosis of the pancreas may render the palpation of stones difficult. Multiple stones yield a peculiar crepitus on palpation. STUART GORDON

How to Evaluate the Actual Dangers of the Injection of Sclerotics in the Treatment of Varicose Veins. Janz, G., *Münch. med. Wchnschr.*, 1932, 79: 2107.

Intravenous injection of sclerosing substances gives rise to two types of serious accident; first, pulmonary embolism, which is sometimes fatal; and, secondly, chronic ulcers which are difficult to heal. The possibility of the occurrence of these accidents constitutes the chief objection to the use of this method of treating varicose veins.

Local inflammation, necrosis, and chronic ulcers are easily avoided if care is taken to preserve a correct technique in performing the injections. One should be especially careful to make the injections strictly intravenous, and when the needle is withdrawn to apply pressure over the point of injection, to be sure that none of the injected material leaks back into the tissues. The author especially emphasizes the importance of emptying the vein as completely as possible before making the injection, either by forcing the blood out manually, by elevating the limb, or by bandaging. By this means the sclerosing fluid is diluted as little as possible by the contents of the vein.

Embolism constitutes the gravest danger, although its occurrence is extremely rare, and probably at least a hundred times less frequent than in the surgical treatment by saphenous ligation. An aseptic thrombosing process brought about by the injection of sclerosing substances

does not tend to produce embolism. Infection and blood dyscrasias are the most common causes of embolic accidents.

In consideration of the possibility of accident careful attention should be given to such contraindications as cutaneous or general infection, previous thrombophlebitis, and arterial disease.

LALL G. MONTGOMERY

Phrenic Anæsthesia as a Test Operation, Hein, J., *Deutsche med. Wchnschr.*, 1932, 58: 2028.

Exeresis or section of the phrenic nerve produces variable and unpredictable results in different persons. While in some cases a marked elevation of the diaphragm with consequent pulmonary collapse results, there are other cases in which, even in the presence of the same indications, more or less complete failure results. In order to avoid these failures the author advocates the systematic practice of a test anæsthesia of the phrenic nerve. An injection of a solution of 0.5 per cent novocaine into the nerve will cause a transitory paralysis lasting for one-half to two hours. The radiological study of the patient as well as a study of their clinical tolerance during this time will permit a more exact evaluation of the possible results which might ensue, were a total exeresis carried out. In all cases observed by the author the results of the subsequent operation were identical with those obtained by the ephemeral paralysis caused by the anæsthesia. The test is easily carried out and is free of risk to the patient, while it gives valuable information as to the advisability of performing a complete phrenic avulsion.

LALL G. MONTGOMERY

Gynæcology and Obstetrics

Epithelial Proliferation in the Cervix Uteri during Pregnancy, and its Clinical Implications. Hofbauer, J., *Am. J. Obst. & Gyn.*, 1933, 25: 779.

The data collected by routine examination of 29 gravid uteri, and especially of the epithelium covering the cervical canal and its glands, reveal a remarkable difference in degree of the epithelial alterations. All showed various evidences of epithelial activity, but in 8 cases very representative activity was present. In this group the principal epithelial variations observed were: epithelial proliferation with stratification; occurrence of mitotic figures in the proliferating epithelium; considerable epithelial downgrowth into the connective tissue; indirect metaplasia; goblet-cell formation. The generation during pregnancy of multi-layered cells by the proliferating cervical epithelium might be properly designated as epithelial hyperplasia exhibiting certain features of metaplasia. It is the change in the character of any proliferating epithelium which has obviously something to do with the liability to malignant growth.

The author concludes that the morphological appearances of the hyperplastic changes in a small but notable proportion of pregnant uteri with well-defined ingrowths and hyperchromatism do not enable a dogmatic statement to be made upon its significance as a primordium of, or an antecedent to, cervical cancer. No conclusive sequence of events from this remarkable epithelial hyperplasia into genuine cancer has yet been observed. Reasoning by analogy, however, with similar phenomena in the gall bladder, breast and alimentary tract, the writer suggests that the production during pregnancy of solid tongues of proliferating epithelial cells in discrete places of the cervical mucosa may represent an important link in the chain of causative factors for the later development of malignancy. The practical lesson may be drawn that as an important element in cancer prophylaxis proper care of the endocervix in the post-natal clinic requires emphasis on careful inspection and immediate attention to any vascular or granular area in its substance.

ROSS MITCHELL

Etiology of Prolapse. von Graff, E., *Am. J. Obst. & Gyn.*, 1933, 25: 800.

Whether or not prolapse develops is primarily dependent upon the functional efficiency or inefficiency of the mesodermal structures, such as connective tissue, fascia and muscle. In some cases occult spina bifida is present. Birth injury acts merely as an initiating factor in the development of prolapse. In healthy women more than 50 per cent never suffer from prolapse, regardless of the number of children they have borne. Prolapse develops most commonly during the climacteric, at which time the tissues of the body become relaxed and less resistant, so that a slight degree of constitutional inferiority may become manifest. The early appearance of prolapse after the first delivery stigmatizes the patient as being constitutionally inferior. Retro-displacement of the uterus by itself does not favour the development of prolapse, but it may be of significance as a symptom of the patient's constitutional inferiority. Therefore, it is not justifiable to operate upon patients with movable retroflexions under the pretence of prophyllaxis.

ROSS MITCHELL

Urology

A Consideration of the Malignant Prostate and Associated Obstructive Manifestations. McCarthy, J. F. and Kramer, S. E., *Am. J. Surg.*, 1933, 19: 209.

In speaking of cancer of the prostate we must think of the usual type encountered clinically and also of that large group of chronically hypertrophied and inflamed prostates in which a typical hyperplasia produces precancerous and early cancerous changes. While the impor-

tance of these latter changes is not to be minimized it is true that such findings are more frequent than is the established disease. It is however generally recognized that nearly 20 per cent of prostatic enlargements are malignant. In considering general etiological factors the author specially stresses the fact that since the advent of resection observers have all noted the prevalence of acute or chronic inflammation in practically all tissue removed. He believes this point should receive more attention, as it may result in the disordered state of cell activity we call cancer. Since these early cancerous changes are found more frequently than the established disease the inference is that the epithelial hypertrophy may assume the characters of cancer.

The diagnosis depends largely on rectal examination, the classical signs being nodulation, induration and fixation. Instrumentally suspicion may be aroused by an obvious loss of elasticity and atypical visual changes about the bladder neck. Since the early diagnosis of cancer of the prostate must in large measure rest with the general practitioner, prostatic palpation should be a routine step in physical examination. To substitute urotropin in such a patient for a proper examination is a violation of trust. The author argues that if we treat early obstructions and prevent these cases from later developing definite prostatism we not only shall be doing a great service in respect to that disease, but we shall also prevent a number of prostatic carcinomata, since a very appreciable number begin from benign enlargements. This relief can now be easily accomplished by endoscopic revision, a proven method which compares in no way in seriousness with the operation of prostatectomy. Similarly, in the palliative treatment of all prostatic cancers this method allows us to tunnelize the urethra and to exercise a complete control of subsequent intrusions. With the addition of deep x-ray therapy these patients are offered a degree of comfort and economic usefulness hitherto unattainable. It is admitted that the hope of actual cure in definite cancer of the prostate is remote whatever treatment is employed.

Radium is of no great value in these cases because of the difficulty of precise radiation due to inaccessibility and also to the early occurrence of metastases.

N. E. BERRY

Ophthalmology

A Syndrome in Uveal Tuberculosis. Finnoff, W. C., *Arch. of Ophth.*, 1933, 9: 13.

Increased intra-ocular tension accompanying uveitis is not an infrequent symptom. This is especially true in ocular tuberculosis of a certain type, and when accompanied by other characteristic symptoms it should strongly suggest the nature of the etiology of the ocular disease. The author has been impressed with

the frequency with which the following group of signs accompanies a certain form of ocular tuberculosis:— (1) keratitic precipitates; (2) evanescent grayish nodules at the pupillary margin of the iris (so-called Gilbert-Koeppel nodules); (3) increased intraocular tension; (4) vitreous exudates; (5) one or more yellowish tubercles in the choroid.

In tuberculous uveitis pain and circumcorneal injection are inconspicuous symptoms, and their sudden appearance should suggest a rise in intraocular tension, and not necessarily an aggravation of the tuberculous inflammation. A rise in intra-ocular tension in cases with large mutton-fat deposits on the posterior surface of the cornea, and a deep anterior chamber, should strongly suggest tuberculous uveitis, especially after sympathetic ophthalmia and syphilis have been excluded. The finding of the foregoing symptoms should always call for a critical and painstaking examination of the fundus with a widely dilated pupil. This can be accomplished without danger in most cases if a mydriatic that can be controlled with pilocarpine or physostigmine is used. Choroidal lesions should be looked for. As a rule there is only one tubercle, but occasionally several are found.

S. HANFORD MCKEE

Neurology and Psychiatry

Tumours of the Gasserian Ganglion. Cooper, M. J., *Am. J. M. Sc.*, 1933, 185: 315.

These tumours are relatively rare. The author includes a description of 3 cases to add to the previously reported total of 76, and he has made a statistical summary of the signs and symptoms in the whole group. The clinical picture is most frequently characterized either by an initial symptom, such as pain in some part of the trigeminal distribution, subjective numbness in that area, impairment of vision or hearing, nausea, vertigo, or headache, or by an objective finding, such as trigeminal sensory impairment or hyperesthesia, diminution of the corneal reflex, or weakness of the motor division, or by a combination of more than one of these manifestations. No single symptom or sign occurs invariably. Syndromes closely resembling the clinical picture of tumour of the Gasserian ganglion may occur in association with tic douloureux, neuralgias secondary to sinus or dental disease, atypical neuralgia, post-zoster neuralgia, syphilis, tuberculosis, and cerebello-pontile angle tumour. Exploratory operation is justified for patients who suffer suspicious constant trigeminal pain not satisfactorily explained, and for patients who show objective indications of interruptions of the trigeminal motor or sensory pathways without evidence of an etiology other than ganglion tumour. Palliative section of the sensory root is justified in patients in whom extirpation of the tumour is not feasible.

FRANK A. TURNBULL

Mental Symptoms Associated with Brain Tumour. Minski, L., *J. Neurol. & Psychopathol.*, 1933, 13: 52.

Fifty-eight cases of brain tumour with mental symptoms were examined and several interesting points are well brought out by the author. In 84 per cent (49 cases) of this group the neoplasm lay in the cerebrum; further, of these 49 cases, 38 were left-sided. It appears then: (1) that mental symptoms are much more common in supra-tentorial lesions; (2) the greater incidence of left-sided tumours may be attributable to the associated speech disturbance; (3) in the sub-tentorial tumours mental signs were seldom found and when present appeared to be due to the generalized increase of intracranial pressure rather than to localization.

Based on a thorough psychiatric examination further instructive facts are brought out. (1) In slowly growing tumours personality changes predominate. The type of change consists mainly in an exaggeration of the patient's previous characteristics, i.e., the individual, cheerful and jolly in health, tends to become euphoric and jocose, even manic; the shy seclusive type shows marked depressive trends. In this series two depressives were found to every euphoric (14-7). (2) In rapidly expanding lesions the mental disturbance is much more in the nature of intellectual deterioration, memory loss, with or without clouding of consciousness. (3) Twenty-five cases showed reactions simulating functional psychoses—schizophrenia, anxiety state, etc. Of this group 12 showed no neurological signs whatever.

G. N. PATERSON-SMYTH

Pathology and Experimental Medicine

The Present Status of our Knowledge of the Ovarian Hormones. Finkel, H. S., *New Eng. J. of Med.*, 1933, 209: 473.

The anterior pituitary gland produces a hormone called the anterior pituitary sex hormone, which acts on the ovary. It is probable that, like the posterior pituitary, it is made up of two components, which are called "A" and "B". The "A" portion is called the "follicle-ripening" hormone. The maturing Graafian follicle produces a hormone which acts upon the endometrium. This substance has been called "folliculin" or "œstrin" or "theelin". The last is the most accepted term. The "B" hormone of the anterior pituitary causes the follicle to rupture, discharge the ovum, and become a corpus luteum. The "B" hormone is called the "luteinizing" hormone.

Ovulation usually occurs in the mid-interval between two periods. The production of theelin is continued in the corpus luteum, and, in addition, a second hormone is formed, called "corporin" or "lutein" or "progestin". Its function is to stimulate the progressive growth of

the endometrium during the second half of the menstrual cycle.

Theelin increases in the circulation and inhibits the formation of the anterior pituitary secretion. This results in the withdrawal of theelin and progestin. The endometrium built up to the premenstrual phase, and relieved of the endocrine stimulation, undergoes a hæmorrhagic disintegration called menstruation. The disappearance of theelin from the circulation removes the inhibition from the anterior pituitary gland. The "A" hormone becomes active and a new cycle is started.

In pregnancy the cycle is exactly like the non-reproductive cycle up to the point of fertilization, which takes place shortly after ovulation. The chorion of the fertilized ovum is the source of the anterior-pituitary-like hormone whose presence in the blood and urine of pregnant women was first detected by Aschheim and Zondek. They call this "prolan". It has two components, "prolan A", which is follicle-maturing and "prolan B", which is luteinizing. Under the influence of "prolan B" the corpus luteum continues in full function as the corpus luteum of pregnancy. It continues to produce theelin and progestin which act on the endometrium to produce decidua. The presence of the luteinizing hormone is the basis of the Aschheim-Zondek test for pregnancy. Theelin is also found in the blood and urine during pregnancy. Progestin has not been found.

Theelin is responsible for the development of the breast which takes place at puberty. Progestin also has a stimulating action on the breast; this causes the fullness preceding menstruation. During pregnancy the breast undergoes still further stimulation from the action of theelin and progestin. The onset of lactation is due to a stimulus from the anterior pituitary which is called "prolactin." It is likely that "prolactin" is released as a result of the withdrawal of theelin from the circulation.

Theelin is available commercially in ampoules for hypodermic injection, in tablets and capsules for oral use, and in suppositories for vaginal administration. It is much less effective when given by the mouth. Progestin is not yet available in active form. The luteinizing hormone is available only for hypodermic use.

The pharmaceutical manufacturers are unrestrained in their enthusiasm. The author's personal experience has been disappointing. Critical examination of the favourable reports frequently discloses grounds for scepticism, such as an inadequate period of observation, concomitant therapy, subjective criteria, and absence of controls. Carefully controlled observations of the action of these substances in the human being are still scanty. Effects of a possibly harmful nature have been noted. In the future, when indications are clearer and the preparations are more potent, we may expect

results as striking as are now obtained with thyroid and insulin.

LILLIAN A. CHASE

Quantitative Behaviour of Prolan A in Teratoma Testis. Ferguson, R. A., *Am. J. Cancer*, 1933, 28: 269.

The appearance of the sex hormone of the anterior hypophysis (prolan A) in the urine of a man suffering from teratoma testis was first observed by Zondek in 1929. In 1931 the writer and his associates reported their preliminary findings on the use of the Aschheim-Zondek test in the diagnosis of teratoma in 12 cases, and also observed that irradiation of the tumour causes the disappearance of prolan A from the urine. The writer now reports a study of 117 cases. The technique of the test is described, and emphasis is laid on the necessity of quantitative methods and multiple observations in order to demonstrate greater or smaller amounts of the hormone in the urine.

Zondek has shown that the hormone, as found in the urine of pregnancy, consists of two fractions. The first, prolan A, or follicle-ripening hormone, is responsible for the production of reactions I and II in the ovary of the immature mouse; the second fraction, prolan B, is the luteinizing hormone and is responsible for the formation of the corpora lutea atretia in the ripened follicles. Reaction I consists in hyperæmia and swelling of the follicle and formation of a cuniculus oophorus. In reaction II massive hæmorrhages are found in the ripened follicle. The formation of corpora lutea atretia constitutes reaction III. Zondek and others have attached no significance to reaction I in pregnancy, requiring the presence of reactions II and III for positive interpretations. The present study tends to show that reaction I is of the utmost importance and should be used in the study of the male urine without reservation. The gross interpretation of the reaction in the mouse ovary must always be compared with microscopic sections, and when properly interpreted the test is 98 per cent accurate.

The hormone does not appear in normal male urine, in patients suffering from functional or organic disease of the genital apparatus, or in functional disturbances of the pituitary other than those evoked by new growth. As far as is known both prolan A and B appear in the urine of teratoma cases within 21 days from the onset of swelling in the testis. It is known that the output increases definitely in proportion to the embryonal character of the tumour and decreases as it approaches the adult type, though there was no case in this series in which it was impossible to demonstrate prolan A to the extent of reactions I and II in excess of 50 units per luteum.

The great value of the test lies in the fact that excision or irradiation of the tumour causes diminution in the amount of hormone in the urine, to complete absence with complete arrest,

and reappearance with recurrence of the growth or with the development of metastases. The test too is strictly quantitative. Thus if the type of tumour is known the amount of hormone in the urine is a certain indication of the extent of the disease, and the rapidity of its disappearance following radiation is in direct proportion to the radiosensitivity of the tumour. The test is thus of much prognostic value, and metastases may be determined by it weeks before their clinical manifestation.

It was an interesting and repeated observation that these cases coming to autopsy all showed epithelial hyperplasia and congestion of the prostate and seminal vesicles, and it seems highly probable that the incidence of benign hypertrophy in old men may be definitely related to disturbed endocrine function. Similar changes were constant in the hypophysis and adrenal and still further support this view.

The question is discussed as to whether the tumour produces a hormone which stimulates the secretion of prolan A or whether prolan A is essential to the growth of embryonal tumours of the testis. The conclusion is that the biological approach to the disturbed endocrine physiology of the tumour host is a fertile and untitled field of cancer research.

N. E. BERRY

Therapeutics

Typhoid Vaccine in the Treatment of Chorea.

Capper, A. and Bauer, E. L., *Am. J. M. Sc.*, 1933, 136: 390.

The authors have treated 23 cases of chorea by means of typhoid-paratyphoid vaccine intravenously. The beneficial effect of artificially induced pyrexia in cases of chorea has been recognized for some years, and recently a case of chronic chorea was cured by an intercurrent attack of typhoid fever. These observations led the authors to try the effect of typhoid vaccine which was given intravenously in doses of 0.15 to 0.2 c.c. This amount was usually sufficient to produce a marked chill and a febrile reaction lasting 6 to 8 hours. This dose was repeated every two or three days, depending upon the reaction obtained. Subsequent doses had to be increased in many instances in order to get the desired period of pyrexia. Complete disappearance of the choreic symptoms usually followed the first series of 6 or 7 injections. No untoward effects were observed in 23 patients who received a total of 297 injections.

Their results may be summarized as follows. There were 23 cases, 9 chronic and 14 acute. Nineteen were symptom-free at the time of discharge. In 9 chronic cases in which the average duration of symptoms was $4\frac{1}{2}$ years, 5 patients were cured completely; one showed persistent talkativeness and one blinking of the eyes; a third was discharged to another hospital; and a fourth showed little or no improvement. A re-

examination of eleven cases, 3 to 15 months subsequently to discharge, showed 7, and possibly 8, to be entirely well, in spite of the fact that over 50 per cent of these belonged to the class of chronic chorea.

E. S. MILLS

A Treatment of Sydenham's Chorea. Bateman, D., *Brit. M. J.*, 1933, 1: 1003.

The treatment of Sydenham's chorea, as conducted at present, resolves itself into enforced rest and the use of various drugs; the rest, while most important, to be effective, must be prolonged. As the result of the work of Dr. Sutton, a method of inducing artificial pyrexia in cases of chorea has recently been developed, which appears to be effective in reducing the choreic manifestations and shortening the necessary stay in hospital. It is used as a routine measure in the Children's Medical Service, Bellevue Hospital, New York. The writer describes his own experience with the treatment. Fever is induced by intravenous administration of a typhoid-paratyphoid vaccine, daily, starting with very small doses. Elaborate precautions are taken to prevent hyperpyrexia, as temperatures above 104° are considered undesirable. The discomfort of the treatment is not great. The usual stay in hospital has been shortened, by its use, from seven weeks to four, so that it would appear that such measures are justified. No bad effects have been reported.

W. F. CONNELL

Three Years' Observation of Intensive Bromide Therapy in Functional and Organic Psychoses. Black, N. D., *Psychiatric Quarterly*, 1932, 6: 691.

This is a report of 129 cases treated with massive doses of bromide, of which 121 were functional and 8 organic. Dosage varied from 60 to 360 grains daily, the average being about 90 grains.

In some cases 90 to 180 grains daily were given over prolonged periods. It is interesting to note that 25 years ago Kraepelin used 180 to 230 grains daily in cases of maniacal excitement. The author found that smaller doses led to intoxication as quickly if not more quickly than the larger doses. Early symptoms of intoxication should be looked for closely, namely, drooping of the eyelids, some slurring and indistinctness of speech, and an ataxic gait.

In the organic group of 8 cases marked improvement occurred in only one case, while in the functional group of 121 cases 24 were much improved, 48 improved, 21 slightly improved, and 21 unimproved. In manic-depressive patients improvement was comparatively rapid, but the results were not so lasting as in the præcox cases, and frequent courses of treatment were necessary. In dementia præcox progress was slower and the results more lasting.

Episodes of excitement and depression became

less severe under treatment and the intervals between the attacks were prolonged. Many patients who had regressed to the vegetative level were sufficiently improved to engage in useful work, and conduct disorders were less frequent. In no case was it considered that bromide hastened the progress of mental deterioration.

A. G. MORPHY

Studies of the Functional and Clinical use of Cortin. Hartman, F. A., *Ann. of Int. Med.*, 1933, 7: 6.

Cortin is the vital hormone of the adrenal cortex. Functional alterations that can be attributed to its insufficiency are: asthenias of the nervous, muscular and circulatory systems; renal insufficiency; gastro-intestinal instability; reduced metabolism and growth; lowered resistance to toxins; increased pigmentation and changes in the skin; and reduced activity of the sex organs. These alterations in function, if not too far advanced, can be corrected by the injection of cortin subcutaneously.

Asthenias which are unaccounted for by any known cause can be treated with cortin without harm. The only criterion for the diagnosis of cortin insufficiency in its milder forms is the therapeutic test. Temporary improvement of nervous symptoms, due simply to pharmacological effects of the extract, may be marked, and may raise false hopes that the course of the disease has been checked. The authors use a daily dose of 3 to 10 c.c. of an extract, each c.c. of which is derived from 30 grm. of adrenal cortex. Response may sometimes be noted within a few hours. Treatment is discontinued after one or two weeks, to note the effect.

In the treatment of Addison's disease, due regard should be given to conditions which increase the demand for cortin, e.g., infections, toxins, exposure to heat and cold, dehydration, strenuous exercise, worry, etc. In severe cases, cortin sometimes fails to bring about recovery. Repeated relapses make recovery more difficult. Cortin should, therefore, be administered continuously in severe cases, and in mild cases should be injected immediately upon exacerbation of symptoms, and in increasing amounts, until recovery occurs.

H. GODFREY BIRD

Muscle Extract Treatment of Intermittent Claudication. Newman, M., *Brit. M. J.*, 1933, 1: 611.

The author has treated 10 severe cases with muscle extract (Lacarnol-Bayer). He has also in some cases used a pancreatic extract (Padutin-Bayer). The most important action of these extracts appears to be their dilator effect on the arterioles of the periphery, while the coronary arteries are also dilated. Marked improvement was noted in 9 out of the 10 cases, although in

most other lines of treatment had been tried and had proved quite unsuccessful. Six daily injections of one ampoule were given into the gluteal muscle, followed by 20 minims by mouth, daily, for several weeks. Lacarnol was used in the 3 cases whose histories are cited in detail. No bad effects whatever were noted.

W. FORD CONNELL

Obituaries

Thomas Henry Bier, M.B., Brantford, Ont., died on August 19, 1933. In these few words is related the passing of one of the most widely known and highly regarded physicians of Western Ontario.

Born at Brantford on September 28, 1873, Dr. Bier obtained his public school and collegiate education in that city, and graduated in Medicine from Toronto University in 1896. Returning to his native city, he was for two years associated with the late Dr. Levi Secord in an extensive rural and urban practice. In 1898, he married Miss Ellen Martha Frogley, of Toronto, and opened an office of his own in Brantford. During the remaining thirty-five years of his life, he was one of the city's busiest practitioners, and in particular developed an obstetrical practice of unusually large proportions.

Doctor Bier possessed in an eminent degree those qualities which command the respect and even adoration of his patients, and at the same time he maintained such a high standard in his professional relationships that he was held in equally high esteem by his confrères. He might well be described as specializing as a general practitioner. If his patients needed surgical attention, he called in a surgeon; if they needed the services of an ophthalmologist or an otologist he advised them where to go,—the main consideration invariably being the patient's best interest, which after all is the finest epitaph any physician can have.

Besides his widow, Dr. Bier leaves two sons and two daughters: Dr. Leslie Bier, of Villa Lusa, Angola, South Africa; Mrs. W. W. Winans, of New York City; Miss Marion Bier at home; and Mr. Marshall Saxe Bier, at present studying Business Economics at the University of Western Ontario.

E. R. SECORD

Dr. Dan Buchanan. There passed away suddenly at the home of his son in Detroit, Mich., on September 7th, a well known practitioner of Galt, Dr. Dan Buchanan. Mrs. Buchanan and the doctor had motored to Detroit the day before, with the doctor in his usual health, and the sudden end came from an attack of angina pectoris.

Doctor Buchanan was born at Washington, Oxford County, in 1868. His parents moved to Brant County while he was a small child. He was educated at Galt Collegiate and the University of Toronto, graduating M.B. in 1896. He then went to London and Edinburgh and returned with his M.R.C.S. He began general practice in Galt and always enjoyed a large measure of success. He was a very skilful anaesthetist and had given perhaps more anaesthetics than anyone in Galt. He was a member of the Canadian Medical Association, Ontario Medical Association, and the South Waterloo Medical Society. He had been president and, at the time of his death, was treasurer of our local society, and had been for many years a member of the Board of Galt Collegiate Institute and at one time chairman. He was a Mason and a Forester, and a member of the United Church in which

he had been an officer for many years. In politics he was a liberal. He was an expert golfer and curler and had won many trophies.

Doctor Buchanan was twice married, first to Miss Paul, and his second wife, who survives, was Josephine Lundy. Dr. W. Paul Buchanan is a son. Four brothers: Rev. John Buchanan, M.D., missionary in India; William and Harvey of Galt; and Washington, a dentist in St. Catharines; and one sister, Mrs. C. McDiarmid, of Ladysmith, B.C., also survive.

The doctors of South Waterloo will miss his happy smile, for he was a friend to everyone. The funeral was largely attended, many of his old classmates coming long distances to be present.

WARD WOOLNER

Dr. V. E. D. Casselman, of Vancouver, passed away on September 16th, at the age of sixty-three. The late Dr. Casselman graduated in medicine at the University of Manitoba in 1897, and in the same year followed the gold rush to the Klondike, the party of which he was a member whip-sawing their own boards, to build a boat, on the shores of Lake Lebarge. Coming to Vancouver in 1907, he practised there for twenty-six years. During the war, he served overseas with the C.A.M.C. He was prominent in Masonic circles, and had been president of the Vancouver and British Columbia Medical Associations. He was distinguished for his genial humour, unfailing kindness and sincerity, qualities which made him universally liked by his confrères and patients. His travels had given him a wide experience of men and places, and as a result, he was an entertaining raconteur. His place in the Vancouver profession will be hard to fill.

Dr. Gaston A. T. René de Cotret, Montreal, specialist in obstetrics in the Ste. Justine Hospital, died on October 10, 1933, after a short illness. He was 42 years old, and the son of Dr. E. A. René de Cotret of the medical faculty of the University of Montreal. He is survived by his widow, his father, and his sister Mrs. Léon Lajoie, Three Rivers.

Dr. de Cotret was born in Montreal and educated there. He graduated in medicine at the University of Montreal (1915). He then started a service of eight years as an interne in Notre Dame Hospital and stayed six years more as head of the interne staff. In 1921 he took a post-graduate course in Paris. At his death he was head of the maternity wards of Ste. Justine Hospital and also professor in the School of Social Hygiene.

Dr. C. Fréchette died on September 28th at Leominster, Mass., at the age of 64. He was born in Montreal and took his medical course at the Victoria Medical School.

Dr. Allan Gibson, died at his late residence, 113 Norfolk Street, Guelph, on September 27, 1933. He was a graduate of the University of Toronto (M.B., 1895). He is survived by his widow, formerly Margaret McDougall.

Dr. James Austin Payzant, of Vancouver, died recently in seventy-seventh year. Funeral services were held on September 18, 1933.

The deceased, who was born in Hants County, N.S., was the son of Dr. Elias N. and Caroline Payzant. He graduated from the Baltimore College of Medicine and Surgery in 1884, took post-graduate work at the University of the City of New York, and later studied at the Royal London Ophthalmic Hospital and the Central London Throat and Ear Hospital. For several years he practised his profession at Burlington, N.S., before coming to Wallace, Idaho, where he lived until 1903. He later practised at Spokane, Katalla, Alaska and Seattle. Following the World War he returned to Halifax, but in 1925 he retired and came to Vancouver.

Besides his wife he is survived by a sister, Mrs. Carrie Pitt, of Hamilton, Bermuda.

Dr. Louis Marcell Pelletier, of Rigaud, Que., died suddenly on September 16, 1933. Dr. Pelletier was considered one of the last of the "Old School" of French-Canadian medics in the country. He was in his seventieth year.

Born at St. Roch des Aulnais, Que., the son of Jean and Anna Pelletier, Dr. Pelletier received his preliminary education at Ste. Anne de la Pocatière and graduated from the old School of Medicine and Surgery of Montreal (1889), which is now the Faculty of Medicine of the University of Montreal. Soon after graduation, he married Evelyn Champagne, daughter of the late Judge C. A. Champagne, of St. Eustache, Que. He practised first at Westpay, Michigan; then in Hull, Que., and later in Rigaud. He retired several years ago from active work.

Dr. Pelletier was official translator for the Archives at Ottawa. Surviving are his wife, one daughter, Mrs. A. M. Pinard, Hawkesbury; a son-in-law, A. M. Pinard, manager of the Bank of Nova Scotia at Rigaud; and two sons, Lionel and Gaston, both of Montreal.

Dr. Charles-Amédée Robert, of Ste. Hyacinthe, died on September 5th at the age of 61, following an attack of angina pectoris. He was a graduate of the University of Laval, Montreal, where he obtained his degree in 1899.

News Items

Alberta

The Council of the College of Physicians and Surgeons has made a further grant to the library of the Department of Medicine in the University of Alberta, and, when doing so, expressed regret that the profession of this province did not more frequently avail themselves of the excellent list of volumes which any member may be loaned on request.

The Municipal Hospital Act requires a complete survey of the province for the purposes of dividing it into districts. This, so far, has never been done. This work will be started in the near future, and, when completed, the boundaries will remain permanently. A report of the survey will probably be presented at the next session of the Provincial Legislature.

The Calgary municipal hospitals were operated during the first eight months of this year at a deficit or charge to the mil-rate of \$56,005.19, a decrease of about \$1,500.00 compared with the same period last year. Revenue for the eight month period totalled \$93,445.57, while expenditures amounted to \$149,450.76. During the same period last year expenditures totalled \$176,644.97. While revenue totalled \$102,575.98, a charge to the mil-rate of \$71,068.99. The loss this year is the smallest since 1928, when the charge to the mil-rate totalled \$54,143.23 for the eight month period.

Patient days in the municipal hospitals for the eight months totalled 47,218, compared with 46,880 in 1932; 44,928 in 1931; 47,932 in 1930; 49,879 in 1929; and 48,080 in 1928. During the month of August the hospitals were operated at a loss of \$7,377.10. Of this amount the General Hospital had a charge to the mil-rate of \$5,872.86, the Isolation Hospital \$1,476.26, while the Small-pox Hospital reported a loss on operations of \$27.98. There have been no cases of small-pox admitted to this institution since the beginning of

the year. Revenue during August for all hospitals totalled \$11,391.97, while expenditures totalled \$18,769.07.

G. E. LEARMONTH

British Columbia

At the forthcoming Provincial elections, six medical men will be candidates, two as independents, three as Liberals, and one as a member of the C.C.F. It is likely that before the nominations close, others will be announced. The profession was well represented in the last house, and with chiropractic legislation almost certain to be introduced, a leaven of the legitimate profession is most desirable.

The remuneration of certain medical men caring for relief camps in the interior of the province has engaged the attention of the College of Physicians and Surgeons. Any tendency to deal with such practitioners as recipients of relief, rather than in the light of their professional qualifications is to be deprecated.

A hospital for crippled children is in course of construction in Marpole, on the outskirts of Vancouver, and on September 24th, the cornerstone was laid by His Honour, the Lieutenant-Governor. The new institution will be devoted to orthopaedic work.

The Okanagan branch of the British Columbia Medical Association met at Tranquille, in September. Dr. J. E. Harvey, of Vernon, was elected president, and Dr. F. E. Pettman, of Vernon, secretary.

C. H. BASTIN

Manitoba

On September 4, 5 and 6, immediately prior to the annual meeting of the Manitoba Medical Association, the staff of St. Boniface Hospital put on a post-graduate course which was well attended and proved very successful. The program began at 9 o'clock each day and ended at 4. The first day's program was put on at St. Boniface Sanatorium, St. Vital, and the other two at St. Boniface Hospital.

Plans are being entertained for the reopening of a department for out-patients at the Winnipeg General Hospital. The Board of Trustees of the hospital has placed certain facilities at the disposal of the Faculty of Medicine at their request. It is proposed that members of the faculty will conduct a limited consultation clinic in which patients will be seen only on medical reference and according to conditions already laid down by the medical staff in connection with ward and out-patient service for those on unemployment relief. The number of patients will be limited to approximately fifty daily, including new patients. Charges will be made where collectable both for clinic service and ancillary services. Members of the Junior League have volunteered to do secretarial work. It is proposed to have a daily clinic for medicine and surgery and a weekly clinic for obstetrics and gynaecology and eye, ear, nose and throat.

ROSS MITCHELL

New Brunswick

At the monthly meeting of the Saint John Medical Society, held on September 17th, Dr. Gilbert Peat, Senior Obstetrician at the Saint John General Hospital, read a paper on the "Toxæmias of pregnancy." Dr. Peat gave an extensive summary of the literature on this subject, and added to this his personal experience in the pre-natal clinic and obstetrical division of the hospital. The resulting discussion was led by Dr. W. E. Rowley, and a good number of those present participated.

The New Brunswick Joint Study Committee, representing the hospital, medical and nursing organizations of the province, held a meeting last month in Saint John with Dr. G. Stewart Cameron of Peterboro, President of the National Committee. The chief feature of interest in their discussions centred upon raising the academic requirements for nursing training. The regulation adopted is to be put in force in 1935.

Dr. M. A. Oulton, Medical Advisor to the New Brunswick Workmen's Compensation Board, attended the meeting of the Workmen's Compensation Board officers at Regina. Dr. Oulton also visited in Toronto and on his return spoke very highly of the Physical Therapy Clinic organized and conducted by the Workmen's Compensation Board of Ontario at Toronto.

A meeting of the New Brunswick Nurses' Association was held at St. Stephen on September 12th and 13th. Miss A. J. McMaster was re-elected President of the Association. Many subjects of interest to the nursing profession were discussed and it was decided that no change in nursing fees would be made at present.

Dr. R. J. Collins, Superintendent of the Saint John Tuberculosis Hospital, is at present in Great Britain doing post-graduate work. During his absence, Dr. Laughlin McPherson is Acting-Superintendent of the hospital at East Saint John.

Dr. Arthur Melanson, Travelling Tuberculosis Diagnostician, is at present in Toronto taking a course leading to a diploma in public health. In his absence, Dr. Austin Clark, late of the Tuberculosis Hospital, is acting for him.

Dr. J. E. Paulin, Medical Health Officer for the northern counties of New Brunswick, is at present doing post-graduate work in Toronto leading to the diploma in public health.

Dr. H. L. Abramson, Provincial Pathologist, is at present confined to his home by serious illness. It is reported that he is gradually recovering.

A. STANLEY KIRKLAND

Nova Scotia

Infant mortality in the City of Halifax, as a result of an epidemic of cholera infantum, has run higher than for several years past. In the course of seven weeks, during the months of August and September, the high total of 35 deaths in children under five years had occurred. Medical authorities have issued a warning as to the precautions which should be taken with regard to milk supply, protection from flies and general cleanliness.

Dr. Frederick Granville, who graduated in 1933 from Dalhousie University, has been appointed Resident Medical Officer at Camp Hill Hospital, succeeding Dr. Donald Grant, who has gone to Noel, Hants County, to begin the practice of his profession.

Dr. P. S. Campbell, of the Provincial Department of Health, has been appointed Chief Health Officer of the Department. He succeeds Dr. T. I. Byrne, who was Deputy Minister under the previous administration.

Dr. C. W. Holland, Director of the Student's Health Service at Dalhousie University, reports that all students during the past year were medically examined, and that they are aware of the value of medical examination. Abnormal vision was found in 212; 30 suffered from

some form of heart trouble; many were unaware of their condition until told by the Medical Examiner; persistent abnormal blood pressure was found in 42. Some cases of active pulmonary tuberculosis were discovered. The incidence of this disease was lower among the women students.

Dr. E. W. H. Cruickshank, Professor of Physiology at Dalhousie University, spent part of the past summer at Frankfurt a.M., where he was engaged in research work.

N. B. DREYER

Ontario

The Ontario Hospital Association met in annual session at the Royal York Hotel, Toronto, on October 25th, 26th, and 27th. Meeting conjointly with the Ontario Hospital Association were the Ontario Conference of the Catholic Hospital Association, the Ontario United Hospital Aids Association, and the Canadian Occupational Therapy Association.

Besides those attending from Toronto, 49 physicians from outside points were present for the opening session of the fifth post-graduate course held at St. Michael's Hospital, Toronto, in September. This course, which is held for one week annually, is given without charge and is yearly attracting wider attention.

Dr. F. G. Banting, of Toronto, was recently admitted as an Honorary Fellow of the Royal College of Surgeons of England. On October 12th, he was officially welcomed by Sir Holburt Waring, President of the College. Dr. Banting later left to attend the International Congress at Madrid.

Dr. W. J. Bell, Toronto, Deputy Minister of Health for Ontario, is arranging for a health demonstration to be held in the five eastern counties of Ontario, namely, Stormont, Dundas, Glengarry, Prescott, and Russell. This demonstration will be far in advance of any other public health demonstration so far attempted in Canada. The campaign will be inaugurated in the County of Stormont within the next month. In addition to the Provincial Department of Health of Ontario, the Canadian Dental Hygiene Council, the Ontario Medical Association, the Ontario Dental Association, and the Canadian Public Health Association, are cooperating in the arrangements.

Dr. Earl V. Metcalfe, of St. Thomas, Ont., was awarded the Roche Scholarship, one of the highest honours obtainable at the Medical School of the University of Western Ontario. The award is based on proficiency, progress, and leadership.

J. H. ELLIOTT

Quebec

Mayor John H. Fyon, of Lachine, has stated that his city has decided to pay fees to doctors and dentists treating unemployed in the city. Druggists will also be paid for the medicine they give to the unemployed. For some time Lachine doctors have been complaining that their services to unemployed and their families were not being paid for and the city decided to pay these bills, though both the provincial and federal governments refuse to allow any money for this purpose in their grants.

Fees for doctors' visits and for dentists' services have been decided upon, said the mayor, who declared that since the commencement of depression he knew that Lachine doctors had given service to the value of \$5,000 for nothing. It is understood, however, that these fees will only be paid in cases where the city had authorized the treatment or the purchase of medicine.

Saskatchewan

A recent Saskatchewan Gazette states that under the provisions of the Hospital Act the regulations (February 15, 1926) governing hospitals are to be repealed and that new ones are to be substituted. Among the new regulations the following are of interest.

Every hospital over two storeys in height shall be of fireproof construction. Safety x-ray films must be used.

Seven other clauses deal with precautions against fire.

There are five clauses regarding ventilation.

Regarding basements, the regulations state that no person shall be permitted to sleep in any basement where the floor is more than four feet under the level of the ground.

Every hospital shall have accommodation for the care and treatment of maternity cases, to the extent of one-tenth of its total authorized bed-capacity.

It has been demonstrated that the use of masks by the physicians and assisting nurses at all confinements has greatly reduced puerperal sepsis, and this precautionary measure is strongly recommended.

Every hospital with an authorized bed-capacity of 75 beds shall employ at all times at least one intern, whose qualifications shall comply with the requirements of the Medical Profession Act. An additional intern shall be employed for every 75 beds.

Every hospital of 70 beds and over shall have (1) a qualified dietitian; (2) a clinical laboratory equipped for doing ordinary urinalysis, blood counting, examination of swabs, smears and sputum; the board shall appoint a person qualified to do this technical work; (3) available x-ray facilities, preferably in the hospital.

All graduate nurses employed on a hospital staff shall be registered in the Province of Saskatchewan. All hospitals shall employ at least two graduate nurses registered in the Province of Saskatchewan, one of whom shall be matron.

Dr. G. Medley T. Hazen, who is a graduate of the University of Toronto (1923) has returned to Saskatoon from a post-graduate study in Europe. In the future he will restrict his practice to that of eye, ear, nose, and throat.

Instead of the original 12-hour duty for \$5.00 the Regina Registered Nurses' Association has adopted an 8-hour duty for \$3.00. The hours may begin from 7 a.m. to 3 p.m., or from 3 p.m. to 11 p.m., or from 11 p.m. to 7 a.m. according to the patient's wishes.

The Saskatchewan Cancer Commission gave a dinner for the members of the Consultative Diagnostic Clinics in honour of Dr. Joseph Colt Bloodgood, Professor of Surgery, Johns Hopkins University, Baltimore, Md., at the Assiniboia Club, Regina, Sask.

The Medical Section of the Conference of the Associated Compensation Boards of Canada met at Regina on September 6th, 7th and 8th. The Chief Medical Officers of every Workmen's Compensation Board in Canada, except Ontario, were present. After the general business of the Conference was completed several papers were read, dealing with the difficulties encountered in the operations of the Boards. Very helpful discussions followed.

Medical fees in general received attention; it was found that in each province means had been adopted to reduce medical expenses. Schedules were to be exchanged for comparison. The meeting found that the total amount paid the attending physician in minor cases created the greatest abuse of the system. The Manitoba Board has found a satisfactory method. There a fee of \$3.00 is paid for the first visit and necessary subsequent visits up to 72 hours,



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It was found that the uniform procedure adopted was to pay mileage to the doctor on his first attendance, where it was found that it might have been dangerous to move the patient without medical attendance; otherwise the employer pays the cost of transportation of the injured workman to the nearest hospital or doctor.

First-aid regulations were considered. It was decided to recommend to the various boards the adopting of the British Columbia First Aid regulations as a standard for first-aid requirements in order to secure a uniform first-aid service.

In each province it was found physiotherapy treatments required the sanction of the Board.

A paper was read on traumatic spondylitis, or Kuemmel-Verneuil's disease. The meeting considered that the incidence of Kuemmel's disease in 12 cases out of a possible hundred emphasized the great care which should be taken in watching for this condition.

Fractures of long bones were discussed. It was the opinion of the meeting that with the use of properly applied skeletal traction open operation was seldom required, and that ill-advised operation resulted in prolonged disability and frequently caused permanent disability. The use of Lane plates and other metal devices was especially condemned. It was stated that open operation should be resorted to only after consultation with a competent consultant, and after the facts of the case had been referred to the Board and received their sanction.

A paper on fractured skulls emphasized the benefit of treatment by withdrawal of fluid from the cerebro-spinal canal and limitation of fluid intake. The danger of early operation for decompression and its frequent fatal result was also emphasized. With these facts the meeting was in agreement, and was of the opinion that early operation on the skull in cases of fracture should be done only after definite indication for the same had been established; that the only conditions where prompt operation would be indicated were very infrequent and comprised compound depressed fractures.

Papers were also read on the difficulties in administration during the depression of the past four years; on the neurotic tendencies thereby created; and on the proper treatment of neurosis following injury. Also papers on fractures of the spine; painful traumatic osteoporosis; low back pains following slight injuries, or so-called sacro-iliac strain; awards in cases of aggravated arthritis or other aggravated condition. It was the opinion of the medical officers that the total of the disability in cases of aggravated arthritis should not be recommended as due to injury, but that the recommendation to the Board should be an estimate for such percentage of disability as would appear to be due to accident.

LILLIAN A. CHASE

United States

The Dental Educational Council of America.—At a recent meeting of the Dental Educational Council of America the Council adopted the following minute relative to the final report of the Commission on Medical Education.

"The Dental Educational Council of America has given special attention to the comment on dentistry on pages 216-217 of the *Final Report of the Commission on Medical Education* (December, 1932). Included in the Commission's comment is the expressed opinion that 'dentistry should be developed *under* medical education.' No reasons for this intended subordination of dentistry are given excepting the general opinions that (a) 'It would seem logical'; (b) 'would be consistent with university principles which no longer recognize the artificial separation of fields of knowledge'; and (c) 'would

go far toward establishing a highly desirable and valuable correlation of the professional training of these two closely related fields of practice' (medicine and dentistry).

"These suggestions for the subjugation of the dental profession are neither impressive nor persuasive. To the Dental Educational Council, cognizant of the related facts in the history of both medicine and dentistry, the proposed development of dentistry '*under*' medical education, in the United States, (a) would seem to be illogical; (b) would be inconsistent with university principles which clearly recognize the public necessity for the self-determination of, and for appropriate differences in education for, the various professions; and, (c) instead of correlating the professional training in medicine and dentistry, would degrade one profession for the exaltation of the other, and also demoralize the service of the practitioners thus dishonoured.

"There should be intimate *co-ordination* between the *principles* and procedures of education for medical practice and for dental practice. Although remaining *independent*, these two forms of health-service education should be made more closely *interdependent* for the betterment of each. The *Council and the dental schools have long promoted this mutual helpfulness*. The strengthening of this constructive educational development, in the public interest, appeals to us as a far more important *interprofessional objective* than the relegation of one profession to a position of *enforced inferiority*. For the attainment of this worthier purpose, we pledge the cordial interest and effective cooperation of the faculties of the dental schools in the United States."

ALBERT L. MIDGLEY,

Secretary.

The Catholic Hospital Association of the United States and Canada.—This Association met in Eighteenth Annual Convention in Saint Louis, Miss., during the month of June, 1933. The following excerpts are taken from the resolutions unanimously adopted at the closing meeting on June 16th. They deal with topics of great importance and will be, therefore, of interest to our readers.

XXVII. Birth Control, Sex Education, and Eugenics

Be It Further Resolved, That this Association hereby formally and openly declare its firm adherence to the teachings of His Holiness contained in the encyclical *Casti Connubii* and that, therefore, it regard as fundamental in all its policies effecting the teaching function of the hospital and the hospital's public relations, the Holy Father's pronouncement that birth control "is an offense against the law of God and of nature" and that, therefore, our hospitals will tolerate no practices or acts, expressed or implied, contrary to this fundamental principle; that furthermore, in the exercise of that same teaching function of the hospital and the hospital's public relations it will base its policies upon the recent decree of the Holy Office on sex education and eugenics.

XXXIV. The Secondary Importance of Medical Economics

Be It Further Resolved, That this Association openly declare its adherence to the principle that the central problem in each hospital is the problem of supplying effective medical care to the patient; that, therefore, all other problems, no matter how urgent temporarily they may be, must be viewed and solved with relation to their significance to the central problem; that, therefore, medical and hospital economics, while urgently important, cannot be considered dominant; that, therefore, all plans of financial remuneration to the hospital or to the medical and nursing profession which focus attention upon the economic aspects in whatever form to the neglect of the dominant position of the medical nursing service, must be regarded with suspicion and that, therefore, this Association hereby utter an

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official word of warning to all of its members to seek in such plans first and foremost the effect which they might have upon the medical service rendered by the institution.

XXXV. The Care of the Indigent

Be It Further Resolved, That in the Spirit of Charity, flowing from the loving Heart of Christ and taught by Him in word and example, this Association cannot and does not regard the indigent as the ward solely of the state and that it record its unwillingness to resign the valued privilege of caring for Christ's poor upon which privilege have been based some of the most outstanding achievements of our civilization, into the hands solely of governmental agencies.

XXXIX. The Overcrowding of the Nursing Profession and with Relation to the Problem of the Smaller Schools of Nursing

Whereas the Council on Nursing Education of the Catholic Hospital Association of the United States and Canada together with its Advisory Committee representing the nursing Sisterhoods, recognizes the present overcrowded condition of the profession of nursing, and

Whereas from many quarters the suggestion has been made that the number of future graduates in nursing can be effectively reduced by the closing of the smaller schools,

Therefore Be It Resolved as Follows:

First, that, while the Council on Nursing Education accepts as a fact the temporary numerical overcrowding of the profession, we must bear in mind the distinction between the overcrowding of the profession and the unemployment in the profession on the one hand and the absolute totals of individuals engaged in the profession and the quality of professional service rendered by those individuals;

Secondly, that it regards this overcrowding as due not so much to the productivity of the smaller schools but rather to other factors, among which must be prominently mentioned the relatively excessive enrolment of the larger schools, the concentration of nurses in urban areas, and particularly the non-utilization of the nurse in fields of influence and interest which the nursing profession had a solid right to expect would be open to them in response to the general demand for increased educational facilities already developed or about to be developed through the combined activities of the nursing profession itself and the colleges and universities;

Thirdly, that the Council on Nursing Education and its Advisory Committee regard the general closing of the small school merely because of its size; that is, of any school larger than that of a minimum size even though it is properly equipped as not only inimical to the best interests of nursing and the nursing profession but also as seriously endangering the interest of public health, public welfare, progressive local and national health programs, and as a discouragement to the legitimate ambitions of worthy aspirants in our smaller communities;

Fourthly, that the Council with its Committee favour the immediate creation of new avenues of employment and use of the graduate nurse not only as a measure of remedying the present unemployment situation in the nursing field but also as favouring progressive health and social programs and thereby insuring more effectively the best interests of the public.

Fifthly, that, therefore, this Council and its Advisory Committee view with considerable alarm the policies inaugurated by apparently more than one state for reducing the number of public health nurses, in which field there should be rather an enlargement of opportunities for nursing service than a retrenchment if the best interests of the public are to be served;

Sixthly, that an increase of opportunities for service be offered the nurse in school health departments, in industrial health departments, in our hospitals, and in

social agencies and in similar organizations and associations;

Seventhly, that, finally, for the better preservation of the small school of nursing, educational facilities be made available by public and private agencies to assist these schools in solving their educational problems and that, therefore, the Council and this Committee recommend to the Catholic Hospital Association the creation of a special standing committee of the Council to be designated as "The Committee on Small Nursing Schools," which should devote special attention to this problem and should report its findings at frequent intervals in the course of the next year to the Council and formulate a constructive program to be presented to the Council and later to the next annual meeting of this Association.

Book Reviews

History of Urology. Prepared under the auspices of the American Urological Association. Vol. 1, 386 pages; vol. 2, 361 pages, illustrated. Price \$8.00. Williams & Wilkins, Baltimore, 1933.

The scope of these volumes can be best comprehended by a glance at the chapter headings. First, there are eight chapters on the history of the American Urological Association and early history of urology in seven cities or districts of the U.S.A., comprising roughly about a third of the first volume. The remaining chapters are devoted to a consideration, mainly historical, but often merely bibliographical, of the advances in the various surgical conditions of the genito-urinary tract.

The chapters are headed consecutively:— anatomy and physiology of the genito-urinary organs, anaesthesia, cystoscopy, and urethroscopy, diagnosis, focal infections, bacteriology, kidney surgery, lithiasis, neuroses and functional diseases, outstanding contributions, prostatism, prostatic malignancy, roentgenology, scrotum, testes, and seminal vesicles, diagnostic tests and chemicals used in urology, non-surgical treatment, bladder tumours, diseases of the urethra and penis, surgery of the ureter, urology in childhood and urological instruments.

There is naturally a great variation in the literary and scientific merit of the articles, but, generally speaking, the various contributors have done their work well. One notes a disparity in the space allotted to the different subjects. Why should focal infections, to choose at random, be given 83 pages, and lithiasis disposed of in 25 pages? Nephropexy covers 20 pages, bladder tumours 14 pages, while no special reference is made to kidney tumours.

In spite of the comprehensive character of the title, the point of view of the volumes is largely that of the United States, and an essentially modern one. This may not be unexpected, nor even unwarranted, when one considers the importance of the American contributions to modern urology. None the less, the beginnings of urology are European, and even modern urology owes many of its most important advances to the Old World. Considering that a special chapter has been devoted to the history of urology in the Middle West of the United States, a reference at least to the history of the specialty in France might have been thought necessary, to say nothing of other countries of the Old World in which important original contributions to urology have been made. It must be admitted that many of the contributors have recognized this fact, and have given due credit where it belongs. On the whole, however, European share in urological history is mentioned only by way of leading up to the development of urology in the United States.

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For this mild criticism, those who chose the title are to be held responsible. Their apparent intention, to judge from the preface, was to give "an historical review of urology in America, (sic)." This has been done, and in an able and comprehensive fashion.

The volumes suffer to some extent from the fact that they are the result of collaboration. Some overlapping and unevenness in treatment may be regarded as inevitable. The use of the critical faculty cannot be developed to best advantage under such circumstances.

None the less, the volumes, which are worthily printed and bound, constitute an important contribution to urological literature. They will well repay the reader for their careful perusal and use as books of reference. The American Urological Association and the Editorial Committee, under the chairmanship of Dr. Bransford Lewis, himself one of the most distinguished and pioneer workers in American urology, are to be warmly congratulated on their work.

Minor Maladies and their Treatment. Leonard Williams, M.D. Sixth edition, 420 pages. Price \$3.00. Baillière, Tindall & Cox, London; Macmillans, Toronto, 1933.

This handy and useful book is now in its sixth edition, which fact is in itself sufficient indication of its excellence. Most medical men when they leave college are well grounded in the features of the outstanding and spectacular diseases, such as pernicious anemia, acute yellow atrophy of the liver, locomotor ataxia, Parkinson's disease, and the eruptive fevers, but are apt to be wanting when they come in contact with the small disorders and trivial complaints so common in the routine of general practice. How to deal with these efficiently and sufficiently is somewhat of a puzzle, and to diagnose some of the major maladies, especially those due to endocrine disturbance, in their incipency, when treatment is of most importance, is more difficult still. Doctor Williams's book will help all those starting out in practice, and some of the older hands as well. There are informative chapters on some common signs and symptoms, coughs, "colds", sore throats, indigestion, constipation, diarrhoea, vomiting, giddiness, rheumatism, neuralgia and headache. A particularly useful chapter is that on minor glandular deficiencies, and others worth study deal with general health, advancing years, and insanity, the book ends with a chapter (by Dr. Ivo Geikie Cobb) on some drugs and their uses, which abounds in practical observation and wise comment. The book is frankly "entirely egotistical", and "in many respects heterodox". It is all the more valuable for these reasons. We could therefore expect it to be fresh and stimulating, and this is the case. The book is written in a bright, interesting, and often amusing, style. It is worth the price over and over again.

Clinical Physiology of the Eye. Francis Heed Adler, M.A., M.D., F.A.C.S., Instructor in Physiology and Ophthalmology, Medical School, University of Pennsylvania. 406 pages, illustrated. Price \$6.00. Macmillan Co., New York and Toronto, 1933.

This volume from Dr. Adler's pen is unique. We, as ophthalmologists, have seldom had the opportunity to read a book which is primarily interested in how the phenomena are brought about which we daily see in eye practice. He has left to our own ingenuity to discover a way to combat them, if they be sufficiently distressing to worry about, or dangerous to the eye ball or to the special sense of sight. That means a good deal in itself; for one does not then feel the need to be therapeutically a "led horse."

The text contains the expressed ideas of many physiologists, and ample reference is made to these, in an index at the end of each chapter. Practically all the moot points in the etiology of eye complaints are discussed. Many of these remain purely theoretical, and so, though disappointment may be felt by the reader occasionally, it is not Dr. Adler's fault that

they are not all cleared up for us. Parts of the discussions will be over the heads of most of us, practising ophthalmologists, who are not expert physicists, but by far the greater part of the text will be appreciated by all.

Eléments d'Histologie. P. Bouin, Professeur à la Faculté de Médecine de Strasbourg. In two volumes. Vol 1, 1929, Vol. 2, 1932. Librairie Félix Alcan, 108, Boulevard Saint-Germain (VIe), Paris.

This is a modern presentation of cytology, histology and organology, attractively printed on coated paper and bound in handsome blue cloth with gold lettering. The prominence which the author enjoys in the world of science ensures an adequate presentation of the subject matter. It is natural to find the modern French work well to the fore, and such well-known names as Masson, Firket, Laguesse, Policard, Guillermond, Duesberg, Brachet, Prenant and Champy are conspicuous in the excellent bibliographies which terminate each chapter, and which provide the reader with the significant modern contributions conveniently arranged. The author is truly international in his outlook, however, and has drawn upon the research publications of the entire world. British and American references are very frequent, and Canadian names, such as Banting and Best, Collip, Cowdry and Bensley are linked with significant advances in our knowledge of functional cytology. Microscopic anatomy is here put in its rightful central place, and is correlated with all of the other biological sciences directly related to the study of medicine. Particularly as an introduction to the study of human pathology is this work to be recommended. Cowdry's "Special Cytology" is heavily drawn upon.

In the 334 pages of the first volume we find a presentation of the cell with its methods of division and differentiation; a morphological and functional classification of the cells, tissues and organs; the supporting, contractile and nutritional elements; the blood, lymph, hæmopoietic system, and vessels for blood and lymph. There are 200 figures, and two coloured plates. There is a historical introduction, giving the evolution of the science, leading up to a modern presentation of the typical vital units of the human body. Here we find particularly discussed the disclosures of cytoplasmic structure which recent techniques have made possible, such as the details of mitochondria, Golgi apparatus, centrosomes, and the various types of inclusions. Nor is the nucleus neglected, and ample is the descriptive matter relating to its changes, particularly with respect to the conceptions of chromosomes and their significance prevailing to-day. In the discussion of the sino-ventricular system we miss the recent studies of Todd and Lloyd. Functional considerations are pushed well forward, and there are plentiful references, as in the case of the description of blood, to changes of interest to the pathologist, as hæmolysis and agglutination. The spleen is considered with the blood-forming tissues; Robinson's work is not mentioned.

The subject matter of Volume II is considered in four functional groups, embracing the cells and organs of (1) nutrition—the digestive tube and annexed glands, the respiratory apparatus, the organs of excretion; (2) interorganic correlation—the endocrine glands; (3) sensation—the nervous system and sense organs; and (4) the reproductive system. It contains 580 pages with 385 figures and 2 coloured plates. The new work on important cells, such as those of the argentaffine type, is well projected. The volumes have to be seen and studied to be appreciated. A feature is the summary in black-faced type which follows each chapter. The introductory synopsis preceding each chapter is convenient, as is also the well-compiled index at the end of the book. The field of histology is here very well covered.